

# SAILING DIRECTIONS

TO ACCOMPANY THE

## CHART

OF THE

# ENGLISH AND BRISTOL CHANNELS, &c.

COMPILED FROM RECENT SURVEYS,

MADE BY ORDER OF

THE BRITISH AND FRENCH GOVERNMENTS.



LONDON, E:

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1874





SAILING DIRECTIONS  
FOR THE  
ENGLISH CHANNEL.

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PART I.  
THE SOUTH COAST OF ENGLAND,  
AND  
GENERAL DIRECTIONS FOR THE NAVIGATION OF  
THE CHANNEL.

PART II.  
THE NORTH COAST OF FRANCE.

COMPILED FROM RECENT SURVEYS

By JAMES F. IMRAY, F.R.G.S.



LONDON, E.:  
JAMES IMRAY AND SON,  
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## ADDENDA.

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**GOODWIN SAND.**—At the commencement of the month of January, 1874, a *lightvessel* was placed  $1\frac{1}{2}$  miles eastward of the Goodwin Sand; the vessel is named “East Goodwin,” and exhibits a *green revolving* light, flashing at intervals of 15 seconds.

Simultaneously with the placing of the above *lightvessel*, the South Sand-head *lightvessel* was moved 9 cables to the southward; the staff and globe on the S.E. Goodwin buoy was removed, and a new buoy, named “S. W. Goodwin,” was placed about midway between the South Sand-head *lightvessel* and the Bunt-head buoy. Page 2.

**DOVER BAY.**—The following remarks relative to the anchorage off Dover are by Staff Commander John Richards, H.M.S. *Lightning*, June, 1870 :—

“Vessels using the anchorage in Dover bay during westerly winds should avoid anchoring with the end of the Admiralty pier on a S.W. by W. bearing: for on this line, between the tidal periods of 5 hours flood and half ebb, the eastern stream carrying the westerly swell with it up Channel and running close past the end of the pier with great velocity, is there met by the eddy or out-flow from Dover bay, which, opposing the progress of the advancing swell, throws up a short turbulent sea along the line of contact in a N.E. by E. direction from the pier end, causing vessels to roll and surge about, risking fouling their anchors and snapping their chains.

Large vessels should therefore anchor outside this line in not less than  $5\frac{1}{2}$  or 6 fathoms low water; with the keep of Dover castle within or westward of the Castle jetty, one-third the distance towards the Boundary groyne, bearing N.  $\frac{1}{2}$  W., and the end of the Admiralty pier West or W. by S.: Shespeare cliff will then be nearly in line with the inner landing stage of the Admiralty pier. Small vessels should anchor with the entrance of Dover harbour open, and not further out than to have the end of Admiralty pier bearing S.W. by S.” Page 11.

**TOR BAY.**—The new harbour at Torquay is fast approaching completion. A massive pier 736 feet in length, is being run off from the rocks adjoining the Bath House, known as the Beacon point; 636 feet in a westerly direction is already completed, the remaining 100 feet, in course of construction, forms an elbow and turns to N.W. This pier encloses an area of about 8 acres. Vessels of 16 to 17 feet water can enter or leave at all times of tide. Heavy screw moorings have been laid down throughout the harbour.

A *red* light is on the south pier-head of the old or inner harbour, and a *green* light on the extremity of the staging at the outer or new pier. Ships running for this harbour at night should keep the red light a ship's length open westward of the green light until the latter is passed.

Steamers short of fuel will find this a convenient place for obtaining supplies at all times of the tide, and at moderate rates. Page 68.

**LONGSHIPS.**—A new lighthouse has been erected on the Longships rock to supersede the former tower, the light of which is now extinguished. The new tower exhibits a *fixed* light (with *red* and *white* sectors); the light is *white* between the bearings from the lighthouse of N.  $29^{\circ}$  E. and S.  $11^{\circ}$  E., leading half a mile outside the Brisons rocks, and three-quarters of a mile outside the Runnelstone; it shows *red* between the bearings of N.  $29^{\circ}$  E. and N.  $44^{\circ}$  E., also between S.  $11^{\circ}$  E. and S.  $31^{\circ}$  E. A *red* light of less power is visible between the lighthouse and the land. A bell is sounded in foggy weather twice in quick succession every 15 seconds. Page 101.



# P R E F A C E

TO

## PART I.

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THIS work,—a Nautical Description of the south coast of England,—has been compiled from various sources of information, but chiefly from the surveys made by order of the British Government. Although considerable care has been taken in the selection and arrangement of the materials upon which it is based, it must be remembered that most of the rivers and harbours comprised within its limits are subject to changes in the depth and direction of their navigable channels; hence a prudent shipmaster should always employ a pilot unless he has a good knowledge of the port, harbour, or river to which or from which he is bound. In the Appendix will be found some remarks upon the manner in which the sands are buoyed, and if careful attention be paid to the “system” there described, little difficulty should be experienced even when a pilot does not offer his services.

As from the nature of the subject it is impossible that a work purporting to be a “Sailing Directory” can be, or can remain any length of time, free from error, it is respectfully requested that any faults that may be detected in this publication be notified to the publishers, who will very thankfully receive communications tending to its improvement.

J. F. I.

LONDON, *January*, 1874.

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1874

# LIGHTS.

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The following is a complete List of the Lights shown at this date, *January 1, 1874*, within the limits of the Navigation described in this work (Part I.) As a full description of them is given in the pages mentioned, it is unnecessary to add more detailed particulars :—

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# SAILING DIRECTIONS

FOR THE

## ENGLISH CHANNEL.

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\* \* \* *The Bearings and Courses throughout this Work are Magnetic, unless otherwise expressed.*

*The Variation at present (1873) is  $18\frac{3}{4}^{\circ}$  W. in the Downs;  $20^{\circ} 30'$  W. at Portland (which may be considered the middle of the Channel); and  $22^{\circ} \frac{1}{4}$  W. at the Scilly Islands. It is estimated to decrease 6' annually.*

*The Distances are in Nautical Miles,—60 to a Degree of Latitude.*

*A Cable is considered to be  $\frac{1}{10}$  of a Nautical Mile, and equal to 100 Fathoms.*

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### PART I.

#### SOUTH COAST OF ENGLAND.

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##### MARGATE ROADS TO SOUTH FORELAND.

WHEN proceeding from Margate roads to the Downs, it is necessary to keep clear of the Longnose rocks, which stretch northward fully two-thirds of a mile from Foreness, a prominent object about midway between Margate and the North Foreland. The northern extremity of these dangerous rocks is marked by a buoy (striped *black* and *white* vertically); but in the event of its not being in position, the danger will be avoided by keeping Birchington church well open of Margate east cliff, until the North Foreland lighthouse bears S.S.W.  $\frac{1}{4}$  W.; thence a S.S.E.  $\frac{1}{2}$  E. course (according to the tide and the distance from the Foreland) will lead to the Gull Stream. A good offing opposite the Gull Stream will be when Foreness appears open of Whiteness N.W.  $\frac{1}{4}$  W., Ramsgate pier-head at the same time bearing W.  $\frac{3}{4}$  S. The soundings are irregular, averaging from 5 to 8 fathoms.

**NORTH FORELAND.**—The lighthouse on the North Foreland is a white tower, 85 feet high, which shows a *fixed* light at 188 feet above high water, visible about 19 miles. An arc of *red* light is also exhibited as a mark for clearing the east end of Margate sand, its limits being between the bearings of N. by W.  $\frac{3}{4}$  W., and N.  $\frac{3}{4}$  E. from the lighthouse.

**SOUTH FORELAND.**—The lighthouses on the South Foreland are respectively 69 and 49 feet high, and exhibit *fixed* lights electric at 372 and 275 feet above the sea.

visible 26 and 23 miles. The towers are white, and distant from each other 1347 feet, in an E. by S. and W. by N. direction.\*

When sailing to the Downs, the track usually followed by large vessels is through the Gull Stream. This is a deep-water channel lying between the Goodwin sands on the eastern, and the Brake sand, with the Gull, Elbow, and other small knolls on the western side. The channel is marked on each side by buoys, which are so placed as best to guard the shoals.

**GOODWIN SAND.**—This sand is extensive and extremely dangerous, as it is shoal all over, and in many parts becomes dry when the tide is down. Near its middle on its western side there is a deep inlet, named Trinity bay, which extends so far into the body of the sand as nearly to divide it into two parts. The northern portion of the sand is known as the North Goodwin, and the southern as the South Goodwin. This inlet commences at the Bunt head buoy, and runs to the N.E. by E. 3 or 4 miles with a depth gradually decreasing from 10 fathoms at its entrance to 15 and 9 feet at its head.

The **North Goodwin** is very shallow, and dries for a considerable extent at low water. It appears to be gradually extending westward, the Bunt head buoy having to be frequently moved in that direction. The whole of this sand is steep, there being deep water at a short distance from it.

The **South Goodwin** is similar in character to the North Goodwin, as it is shallow all over. As already observed, this sand is nearly separated from the North Goodwin by the inlet Trinity bay, which runs into the Goodwin in a N.E. by E. direction. The north-east part of the sand dries for a considerable extent, and is known by the name of Callipers; from this it extends to the S.W. by W. to the South Sand-head, almost the whole of the eastern portion of the sand being dry at low water, and extremely steep, there being within half a mile of it 10 to 12 fathoms.†

At the south-western part of the North Goodwin, and distant about  $2\frac{3}{4}$  miles from the sand that dries, is a shoal of 8 to 15 and 24 feet, called the Bunt head.

\* It is intended to establish a powerful steam fog trumpet at the South Foreland. Masters of vessels are desired not to anchor with the South Foreland lighthouses in one, because the submarine telegraph cable is sunk in that direction. This cable passes a short distance southward of the South Sand-head lightvessel, and afterwards takes a general E.S.E. direction across to the Flemish banks. By anchoring, damage may be done to the cable, or the anchor may be lost.

The telegraphic cable between the South Foreland and France also requires care to avoid. It is recommended not to anchor within the distance of 3 or 4 miles of the shore, with the high light-house bearing between North and N.W.; or beyond that distance when it bears N.W. by N., on which bearing it will appear in one with a dark patch on the cliff.

On the French coast vessels are desired not to anchor with the two conspicuous mills of Coquelles (on the high land between Calais and the village of Sangatte) bearing between S. by E. and S.E. by S.

† On the eastern side of the South Goodwin sand is a *safety beacon* surmounted by a cage, 50 feet above the sea, and reached by steps. The main shaft of the beacon penetrates the sand to the depth of 80 ft.

The following notice relating to wrecks on the Goodwin sand, &c., was issued by order of the Corporation of Trinity House, 8th November, 1832, and may still be in force:—"In case of shipwreck on the Goodwin sand, the following directions are to be carried into effect on board the Goodwin, Gull Stream, and South Sand-head lightvessels.

"If a vessel is on shore to the northward, a white rocket is to be discharged in a northerly direction, fired at an angle of  $45^{\circ}$ . If to the southward, a red rocket is to be fired in a southerly direction, at an angle of  $45^{\circ}$ . If to the eastward, a blue rocket is to be fired in a perpendicular direction."



It is nearly  $1\frac{1}{2}$  miles in extent from N.N.E. to S.S.W. and separated from the body of the Goodwin by a depth of 23 feet. This shoal lies on the north side of Trinity bay, and appears to be gradually extending in a westerly direction: hence it is frequently necessary to shift the buoys defining its limits. The channel between this and the buoys of the South Brake is about  $\frac{1}{10}$  of a mile wide, and 5 to 9 fathoms deep on chalky bottom.

**Goodwin Knoll.**—At a short distance northward from the North Goodwin, and separated from it by a channel 6 to 8 fathoms deep, is a sand bearing the name of Goodwin Knoll, upon which the depth at low water is only 9 to 12 feet. It is very dangerous, especially to large vessels; hence considerable care is necessary when navigating in its vicinity. A *black* buoy, marking its north-western edge in 5 fathoms, must always be passed on its north side.

**NORTH SAND-HEAD LIGHTVESSEL.**—This lightvessel (moored in 10 fathoms water, about a mile eastward of the 5-fathom north extreme of Goodwin Knoll) is principally intended for the use of vessels approaching from northward to guide them eastward of the Goodwin sands. It exhibits three *fixed* lights, each on a separate mast; those on the fore and mizen are 28 feet, and that on the mainmast 42 feet above the sea—thus forming a triangle—and are visible in clear weather 10 miles. A gong is sounded in foggy weather.

From it the South Foreland high lighthouse bears S.W. by W., westerly; Ramsgate pier-lighthouse, W.N.W.; North Foreland lighthouse, N.W.  $\frac{1}{3}$  N.,  $6\frac{1}{2}$  miles; Kentish Knock lightvessel (*revolving* light), N.N.E.  $\frac{2}{3}$  E., 21 miles; and Galloper lightvessel (two *fixed* horizontal lights), N.E.  $\frac{1}{4}$  E., 29 miles.\*

St. Peter's church in line with Broadstairs cliff N.W.  $\frac{1}{4}$  W., leads about  $1\frac{1}{2}$  cables southward of the lightvessel, and 6 cables northward of the northern edge (in 20 feet water) of the Goodwin Knoll. Ramsgate and St. Lawrence churches in line N.W. by W.  $\frac{2}{3}$  W., leads about 3 cables southward of the lightvessel, and just clears the northern edge (in about 30 feet) of the Goodwin Knoll.

\* Every lightvessel under control of the Corporation of Trinity House, London, is coloured red, and bears the name of the station it occupies on its sides. During fog a gong is sounded, and in addition a gun is fired when a vessel is observed standing into danger.

The North Sand-head lightvessel is an excellent guide to vessels approaching the English channel from northward, and no risk of striking on the Goodwin sands will be incurred if proper attention be paid to the three following short and clear directions.

1st.—The grand intention of the lightvessel being to keep vessels eastward of the Goodwin, the masters of all ships approaching the strait of Dover from the North sea should be careful (while northward of it) not to bring it southward of S.S.W.; but on the contrary, should keep it rather westward of that bearing, and they will be sure to pass far enough eastward of every part of the Goodwin by steering a S. by W. course after they have passed the lightvessel.

2nd.—When approaching the North sea from the strait of Dover, they must be equally careful not to shape a northerly course until the lightvessel bears N. by E.; but on the contrary, should keep it rather northward of that bearing while to the southward of it, and they will be sure to pass far enough eastward of every part of the Goodwin.

3rd.—Should any vessel coming from the North sea towards Dover strait be prevented by wind or tide, or otherwise, from proceeding southward, at the back (or, eastward) of the Goodwin, the master can, by a single bearing of the lightvessel, anchor under the North Sand-head in 6 or 7 fathoms clean ground, and ride there as safely as the lightvessel does; in order to do which he should keep northward of the lightvessel, and when that bears nearly South, anchor about  $1\frac{1}{2}$  miles from it. Or, should getting in westward of the Goodwin be preferred so as to have the Gull Stream open, he may run in northward of the Goodwin, upon a N.W. course, until  $2\frac{1}{2}$  or 3 miles within, or north-westward of the lightvessel, and then anchor in 7 or 8 fathoms, with the lightvessel bearing S.E.

**GOODWIN BUOYS.**—The eastern side of the Goodwin sands is at present (1873) guarded by four buoys, of which the *northernmost* (in 11 fathoms) is coloured *black* and *white* in vertical stripes; the *east* buoy (in 19 fathoms) is chequered *black* and *white* and carries a St. Andrew's cross; the *south-east* buoy (in 17 fathoms) is *black* and *white* in vertical stripes and carries a cage; and the *south* buoy (in 14 fathoms) is chequered *black* and *white* and carries a globe. It is almost unnecessary to mention that these buoys must always be passed on their eastern side, —a berth of at least half a mile should be given them, because the tide in their vicinity sets north-westward over the sands, and occasionally with considerable strength.

The western side of the Goodwin is now (1873) marked by three *black* buoys, named respectively *North-west Goodwin*, *North-west Bunt*, and *Bunt Head*. The first is in 13 fathoms, the second in 5 fathoms, and the third in  $4\frac{1}{2}$  fathoms. These must always be passed on their west side.

**GULL LIGHTVESSEL.**—This vessel is moored in  $8\frac{1}{2}$  fathoms in the Gull Stream, about  $\frac{1}{10}$  of a mile westward of the 5-fathom western edge of the North Goodwin, and exhibits at 36 feet above the sea, a *revolving* light (attaining its greatest brilliancy every 20 seconds), visible 7 miles.

**SOUTH SAND-HEAD LIGHTVESSEL.**—This vessel is moored off the southern end of the South Goodwin, in 13 fathoms water. The light (*fixed*) is at 38 feet above the sea, and visible 10 miles. Although there is a safe channel between the vessel and the sands, a prudent shipmaster will always give it a berth in passing westward or southward of it. In the very improbable event of the vessel being absent from its station, it may be useful to remember that Ripple mill, over Kingsdown church N.W.  $\frac{3}{4}$  W., leads northward of the lightvessel, and a short distance southward of the South Sand-head; and Upper Deal mill in line with Walmer castle, N.W.  $\frac{2}{3}$  N., leads midway between the sands and lightvessel; hence with either of these marks the sands may be cleared.

**ELBOW SAND.**—On the western side of the Gull Stream, the first shoal met with in rounding the North Foreland, from northward, is the Elbow; a small crooked bank of 18 to 26 feet water, marked on its south-eastern side by a large buoy striped *black* and *white* vertically, and carrying a cage. This buoy must be passed on its east side, in pursuing the outer (or eastern) track for large vessels, there being many shoal patches of 16 and 18 feet between it and the land, on account of which the inner (or western) passage should be used only by those well acquainted with the navigation.\*

**BROADSTAIRS KNOLLS.**—These are some shallow patches of 9 to 20 feet water lying immediately off Broadstairs, and rendering a close approach to that part of the coast in a large vessel undesirable. The outermost of them is marked by a *black* and *white* (chequers) buoy in  $3\frac{1}{4}$  fathoms, the distance of which from the land is about a mile.

**GULL SAND.**—The Gull, a shoal of 18 to 23 feet water, lies  $2\frac{1}{4}$  miles S.S.W. from the Elbow. Its extent N. by E. and S. by W. is one mile, and at a short distance from its south-eastern end is a chequered *black* and *white* buoy in 6 fathoms, which must always be passed on its east side, at an offing of about half a mile, by large vessels bound through the Gull Stream.

**NORTH BAR.**—At about three-quarters of a mile W.  $\frac{3}{4}$  S. from the Gull

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\* All the foul ground in the vicinity of the North Foreland consists of chalk with loose flints, and occasional ridges of coarse sand over it.



buoy is a small knoll of 2 fathoms, named North Bar, which is guarded on its eastern side by a *black* and *white* (horizontal stripes) buoy. The depth at a very short distance from the shoal on all sides is 24 to 30 feet.

**BRAKE SAND.**—The Brake is an extensive sand southward of those just mentioned, and bounding the Gull Stream on its western side. It is 5 miles long, N.N.E. and S.S.W., and upon it are many shallow patches of 2 to 9 feet at low tide. On its eastern edge are three *black* and *white* buoys, of which the northernmost (coloured in vertical stripes) lies in 3 fathoms, the middle (chequered) in  $5\frac{1}{2}$  fathoms, and the southernmost (horizontal striped and carrying a diamond) in 6 fathoms.

**RAMSGATE.**—The port of Ramsgate consists of an outer harbour formed by stone piers, extending 1310 feet into the sea, and enclosing an area of 42 acres, and an inner harbour or basin divided from the outer harbour by a stone wall. The entrance to the outer harbour is about 200 feet in breadth between the pier-heads, where the depth at high water springs is 19 feet, and 16 feet at high water neaps; at low water there are 6 feet, but a third of the way across the entrance from the lighthouse is a bank with only 4 or 5 feet water on it at the same time of tide. Close to the eastern pier-end a vessel of 8 feet draught may lie afloat, and come in or out, except at very low ebbs, but these depths are very much influenced by the prevailing winds. In this outer harbour are gullies about 140 feet wide, close to and parallel to the piers, in which vessels are safely moored alongside each other in tiers. The eastern gully is the deepest and widest, having 4 to 5 feet at low water over a muddy bottom; the western gully has only 3 feet in it over a chalky bottom, and is altogether, from the undulation, the most uneasy.

Two banks, the east and west, rise in the harbour; the former dries 6 feet, and latter 4 feet, above low water springs, and between them is a channel (dry in parts) leading to the gates of the inner harbour. The east bank is just awash at the time the tide-ball is hoisted, which indicates 10 feet in the harbour, and being composed of sand and mud, is of great service for vessels to run upon, that come into the harbour with loss of anchors. At the head or northern end of the eastern gully is a fine patent slip, 450 feet in length, 350 feet of which is available for the reception of two vessels at the same time, of from 300 to 500 tons burthen, and drawing in ballast from 12 to 14 feet water.

The inner harbour or basin is used for vessels to load or unload, and is also a means for scouring the outer harbour by sluices, and contains a dry dock and two building yards; but the business of the port consists principally in the repair and refit of disabled vessels. The inner harbour is 1520 feet in length, 500 feet in breadth at the centre, 350 feet at either end, and carries a depth of from 14 to 10 feet water. It is entered by single gates, as great despatch is required when vessels are driven into the harbour in bad weather; and when there are many vessels in it the gates are kept closed to keep them afloat, as accidents may occur by vessels of unequal draught grounding alongside each other, or by falling over and getting damaged by the hard chalky bottom. The eastern entrance is 32 feet, and western entrance 40 feet in breadth, and the depth over the sills is 14 feet at high water springs, and 12 at neaps with northerly winds, but 2 feet less with southerly winds. The dry dock is 150 feet in length, 40 feet in breadth, and 30 feet wide at entrance, with 11 feet water over the sill at high water springs, and 8 feet at neaps, but the depth is entirely dependent upon the prevailing winds.

**Lifeboats.**—There are two lifeboats at Ramsgate. In bad weather they are placed

on the deck of one of the two steam-tugs belonging to the port, ready for immediate service.

**Lights.**—The lighthouse on the western pier-head shows a *fixed red* light, while there are 10 feet water in the entrance, which is from about  $2\frac{3}{4}$  hours before until  $3\frac{1}{2}$  hours after high water. In the daytime a red ball, hoisted on the cliffs at Sian hill, N. by W. from the pier-heads, indicates the same depth of water.

On the west cliff a *green* light is shown, which, with another in the lighthouse on the west pier, indicates that the depth of water in the entrance to the harbour is less than 10 feet; when these are in one, they lead in the best water through the Old Cudd channel. When there are 10 feet and upwards at the entrance of the harbour, the *green* light in the lighthouse is not shown; and the *green* light on the west cliff, and the usual *red* light in the lighthouse, constitute then the leading lights through the aforesaid channel. On December 1, 1860, an additional *green* light was shown from a lamp on the west end of Wellington crescent on the east cliff; this, if kept in one with the *red* light of the west pier, leads to the harbour in the best water from the Middle Fairway buoy.

A *flashing* (scintillating) light exhibited from the east pier at an elevation of 25 feet above high water, illuminates an arc of  $224^{\circ}$ , or from the direction of the Dyke buoy round to the centre of the basin gates of the west entrance to the inner harbour. The light shows a flash for 5 seconds, and is then followed by an equal interval of darkness, by which it will readily be distinguished from the town lights behind.

**Ramsgate Channel.**—This channel is westward of the Brake sand, between the Small Downs and Ramsgate, and the only dangers in it are Cross ledge (a shoal of 12 feet water) and a 9-foot flat that extends from the shore abreast No. 2 battery. Vessels of more than 11 or 12 feet draught should not use this channel at low water springs, as there are not more than 12 or 13 feet in it from the middle Fairway buoy to Ramsgate, a distance of about 2 miles.

In Ramsgate channel are three *red* and *white* buoys, named and coloured as follows:—South Fairway (vertical stripes) in 17 feet water on the edge of the flat extending out from No. 2 battery, Middle Fairway (chequered) in 15 feet water, and North Fairway (vertical stripes) in 6 feet water at about a quarter of a mile from Ramsgate west cliff.

The anchorage off Ramsgate is very good with the wind N.W. by W. and N.E. by N.; but with westerly, southerly, or easterly winds a cross-sea gets up, which, with a strong flood, makes it an uneasy roadstead. Anchor with Ramsgate church and lighthouse in one, and Cliff-end farm on with Cliff-end, in about 15 feet at low water over a chalk bottom, or further in shore, according to the vessel's draught; but if drawing more than 12 feet, anchor in Ramsgate hole, in 18 feet water over a clay bottom, which is easily found by bringing Minster mills in one with Cliff-end, and St. Lawrence church just open eastward of the two mills and square tower on the west cliff.

In running for Ramsgate from the Small Downs, with a south-west gale, a vessel should get under way before the tide has done running to the southward, and steer so as to pass eastward of the South Fairway buoy, and thence for the Middle Fairway buoy, from which Ramsgate lighthouse N.E. by N. will lead to the entrance. At night the red light on west pier, and green light on east cliff will be in one, on the same line of bearing.

The best time to enter if the vessel is not drawing more than 10 feet is two hours before high water, or when the tide begins to set to the north-east outside the pier-heads. Pass close to the west pier-head, taking care to keep a large dia-



mond guide mark—white upon a black ground—on the landing platform full in view until the vessel is within the entrance.

If, when approaching the entrance, the tide is setting to the north-eastward, keep good sail on and close the North Fairway buoy, and steer for the west pier-head—the vessel cannot be too close—and if there is not time to run a warp to one of the buoys within the harbour, throw all aback, and let go the anchor; if no anchor, run the vessel on the East bank, directly towards the pier-house.

Several vessels have narrowly escaped destruction by running for the harbour under insufficient sail to give them proper steerage way, and by keeping too far from the North Fairway buoy; thus crossing the stream of tide, instead of coming to the entrance before it.

Whilst the buoys are in position they will form the best guides for the channel, but a good leading mark is St. Lawrence church, appearing about a quarter of the distance from West Cliff lodge towards Pugin's tower, N. by E., until Ramsgate lighthouse bears N.E. by N., when alter course for it, always taking care to avoid being carried to the eastward past the entrance.

In turning through Ramsgate channel from the Small Downs, stand towards the shore by the lead, keeping a good look-out for St. Lawrence church coming on with West Cliff lodge, which is a good mark for going about when approaching the flats of No. 2 battery; tack towards the south-west part of the Brake, when the water deepens to  $4\frac{1}{2}$  or 5 fathoms, as that part of the sand is steep; but when as far up as to bring Sandwich churches to bear W. by N., go about, when the North Foreland lighthouse comes on with Dumpton point; and as there is good reason to believe that this part of the Brake increases to the westward, a good look-out should be kept for the ripple, and not trust too much to the marks. To clear the western edge of the Cross ledge, tack when the tide flagstaff is just seen eastward of Ramsgate church; but when the tide-ball is hoisted the depth over the ledge is 14 feet.

As, however, there are no good clearing marks for the west side of the Brake sand, vessels should not attempt to work through Ramsgate channel without local knowledge; for although the steep inner edge of this danger is generally marked by a ripple, no seaman would be justified in trusting the safety of his ship to such natural causes.

*During night* vessels should not attempt to run for Ramsgate, except in the event of extreme necessity; and to do this they should know their exact position before dark, with the bearing and distance of the South Fairway buoy. They should also keep a good look-out for, and note the time the 10-foot water signal is made. It is much safer to run out through the Gull Stream than to attempt to reach the harbour after nightfall.

Should, however, a vessel from sheer necessity be compelled to run for Ramsgate from the Small Downs, a course should be shaped for the South Fairway buoy, and when abreast it (the Gull lightvessel will bear about S.E. by E.) steer for the Middle Fairway buoy, and when the green light on the east cliff is in one with the light on the east pier-head, N.N.E.  $\frac{1}{2}$  E., steer for them or borrow to the westward so as to bring the red or green light on the west pier in line with the green light on east cliff, N.E. by N.; both will lead towards the harbour's mouth. If the tide be running to the eastward, take care not to bring the light to the northward of N.E. by N. till the vessel almost touches the pier-head, or she will be set to the eastward past the entrance.

**Cliff-end Channel** (the passage between the Quern and the north shallow of the Brake) is 8 or 9 feet deep at low water; but as it is not buoyed, and the tide runs

across it, only the luggers going to and from Ramsgate and the Gull Stream use it. During the survey in 1865 it was found that the position of this channel had changed so much as to render useless the old leading marks through it, but this is of no great importance as the channel should not be attempted under any circumstances, save by those possessing perfect local knowledge.

**Old Cudd Channel.**—The Old Cudd channel, the narrow passage between the Quern and the Dike, is 8 feet deep at low water springs. There is no difficulty in navigating it, as a *black* and *white* (chequered) buoy marks the north end of the Quern, and a *black* buoy the south end of the Dike. To approach it during day, bring the tower of Mr. Pugin's house (standing on the west cliff) open southward of the west pier, N.W. by W.  $\frac{1}{2}$  W.; or the lighthouse closed one-third of the way on the left of the Royal crescent; steer with these marks on between the buoys, and then W. by S.; when Ramsgate church is in one with the end of the chalk cliff a vessel will be past the shallows, and may steer for the harbour.

The leading mark through the channel at night, when the depth is less than 10 feet at the entrance of the harbour, is the *green* light on the west cliff in one with the *green* light in the lighthouse; but when it is 10 feet and upwards at the entrance of the harbour, the *green* light in the lighthouse on the west pier will not be shown; but the *green* light on the west cliff and the usual *red* light in the lighthouse will lead through the channel.

This channel cannot be recommended to sailing vessels at night during an ebb-tide, the navigation being then attended with considerable risk, for when the western tide makes (at half-ebb), it does not set fair through the channel, but shoots across it on to the outer shoal; hence if a vessel is not very quick with her helm she will be set on shore. This frequently happens with fishing vessels and small coasters;—the cause is obvious, for the inner shoal curving off from the shore throws the tide obliquely across the channel.

**Tides.**—It is high water, full and change, at Ramsgate at 11b. 15m.; springs rise 13 feet, and neaps 10 feet, with southerly winds; but these depths are increased 2 feet with northerly winds. The time and duration of high-water level are very much accelerated or retarded by prevailing winds:—northerly winds raising the level rapidly on the flood, and causing it to hold up on the ebb in an extraordinary degree, and southerly winds are as decided in the opposite effects and results.

**DOWNS.**—The anchorage in the Downs is generally considered to be comprised between Walmer and Sandown castles, eastward of the buoy marking Deal bank. If the vessel be large, the best marks are Upper Deal mill in one with Deal castle, W. by S., and the South Foreland high lighthouse in one with the middle of Old Stairs bay S.W.  $\frac{1}{2}$  W.; the depth here is 7 or 8 fathoms, and the position not very far from the *black* and *white* chequered buoy of Deal bank. Vessels may also anchor in the same depth, but a little further northward, with Upper Deal mill open a little northward of Deal castle, and the high lighthouse S.W.  $\frac{1}{4}$  W. Some care is necessary to ascertain the actual position, because it is sometimes necessary to slip away quickly in consequence of a heavy gale suddenly coming on.

Captain Bullock, R.N., says:—"A good berth for large ships will be found in about 8 fathoms, over a chalky bottom, with Upper Deal church a little open southward of Deal castle bearing W.N.W.; Sandwich church just seen northward of Sandown Castle, N.N.W., and the South Foreland high lighthouse (the low lighthouse not seen) in the middle of Old Stairs bay, S.W.  $\frac{1}{4}$  W. Men-of-war and the largest class of merchant ships are recommended not to anchor northward of



the line of Upper Deal church in one with Deal castle; and vessels of about 16 feet draught should select that portion of the Downs northward of these marks, anywhere near the lines of East Bottom telegraph-house in one with the highest part of the southern extremity of Old Stairs bay. When anchored, a bearing should always be taken of the South Brake buoy, to enable the vessel to run for the Gull Stream in case of parting or being obliged to slip. Moor with open hawse to the southward.

The anchorage in the Small Downs lies between Sandown castle and No. 2 battery, abreast the south end of the Brake. It is a far more secure anchorage than the Downs, and for vessels of less than 15 feet draught much to be recommended, not only because it is more sheltered, but because it has better holding-ground, shoaler water, and vessels there are not so liable to be drifted upon by other ships. From it also, in case of necessity, there is greater facility for running to Ramsgate harbour."

**DEAL BANK.**—This bank lies about half a mile off Deal pier in an E. by S. direction, and has upon it a depth of 18 feet at low tide; it is consequently dangerous to vessels of large draught. Close to its eastern edge the depth is 6 fathoms. A *black* and *white* (chequered) buoy in 4 fathoms guards its east side.

**DEAL.**—A pile pier runs out 1100 feet from the esplanade at Deal, and ships in the Downs can be supplied with fresh water from the pier into their own casks at any time of tide, as there is a depth of 10 feet at the pier end at low water. A *fixed red* light is exhibited from the outer end of the pier.

**Time Ball.**—A black ball is dropped daily from the mast in the Royal Naval yard at Deal, for the purpose of giving Greenwich mean time to passing vessels. The ball is hoisted half-mast high at five minutes and close up at three minutes before 1 h. p.m., and is dropped at the instant of 1 h. p.m. Greenwich mean time; the time to be noted being the instant the ball begins to fall from the cross arms of the vane. Should any derangement of the machinery prevent the ball from being dropped at 1 h. p.m., it will be kept at the masthead for ten minutes, and will then be lowered gradually; it will again be raised and dropped by hand, at 2 h. p.m. Greenwich time, but the accuracy of this time cannot be guaranteed within two seconds.

**Lifeboats.**—A lifeboat is stationed at Kingsdown, Walmer, and North Deal.

**DIRECTIONS FOR RUNNING THROUGH THE GULL STREAM.**—Vessels of about 12 feet draught sailing round Foreness, may steer to the south-eastward until the North Foreland lighthouse bears W. by S. distant 2 miles, when a good departure can be made for the Downs. Thence, if the course be directed S.S.W.  $\frac{1}{2}$  W. for about 9 miles, it will carry to a berth between the South Brake buoy and the buoy of the Bunt head, when the Downs will open. This course leads close to the buoy on Broadstairs Knoll, thence over several shoal patches and close to the eastward of the North Brake buoy; the buoys therefore serve as a guide in the course. Although the buoys on Broadstairs Knoll and North Brake may be passed on the west side by a small vessel, unless at low water, it is more prudent to go eastward of them: keep the lead going.

Large vessels always sail eastward of the buoy of the Elbow and that of the Gull, and thence proceed through the Gull Stream. From about three-quarters of a mile off the buoy of the Elbow to the same distance off that of the Gull, the course and distance are S. by W.  $\frac{1}{4}$  W.,  $2\frac{1}{2}$  miles in a depth of 6 fathoms. In sailing to the Downs, and being about half a mile eastward of the Gull buoy, steer S.W.  $\frac{1}{2}$  W., to the Gull lightvessel (a distance of about 4 miles); pass it on the west side, and steer S.W. by S., and it will carry through the Gull Stream to

the Downs between the South Brake buoy and the buoy on the Bunt head. Here the channel is very narrow, and the navigation requires care, but when past the South Brake buoy it becomes wider, and permits greater freedom to be taken.

In hazy weather, when the leading mark through the Gull Stream\* cannot be seen, there is no good mark for keeping a vessel eastward of the shoals off the North Foreland. In this event, the best direction that can be given to large ships is, to take with a sextant the altitude of the North Foreland lighthouse (from the base to the very top of the lantern), for if this angle be less than 10', they will be at a sufficient distance without the Elbow and other shoals, but not so if it be greater. This angle of altitude is only to be taken when just abreast the shoals; and must be observed in the same way as that taken by one vessel when in chase of another, to ascertain, by the alteration of altitude of the chase, whether she gains or loses.

In sailing through in thick weather, the Brake sand should not be approached nearer than the depth of 6 fathoms, nor the Goodwin than 9 or 10 fathoms. Along the Brake the soundings are more regular than towards the Bunt head, the latter being steep. The narrowest part of the channel (between the Brake and Bunt head) is only about half a mile wide, and 6 to 9 and 10 fathoms deep.

A vessel in the Downs so unfortunate as to part her cables, or obliged to slip during a southerly gale and run through the Gull Stream, should endeavour to bring the South Foreland high lighthouse over the middle of Old Stairs bay, S.W., or, if the lighthouse be not seen, should steer so as to pass about 2 cables east of the South Brake buoy and then shape a course for the Gull lightvessel, and thence steer north-eastward with the lightvessel S.W.  $\frac{1}{2}$  W., until the North Foreland lighthouse bears N.N.W., or the North Sand-head lightvessel E.S.E., when she may haul out to the eastward and lie-to.

If wishing to regain her anchorage by turning to windward at the back of the Goodwin, she must not in standing towards that sand bring the North Sand-head lightvessel eastward of North, nor get into a less depth than 30 or 28 fathoms, until abreast of the S.E. Goodwin buoy, when the lightvessel may be brought as far eastward as N.N.E. When the South Foreland lighthouses are in one, W.  $\frac{3}{4}$  N., she will be south of the Goodwin, and may bring Upper Deal mill in one with Walmer castle N.W.  $\frac{3}{4}$  N., which will lead midway between the South Sand-head lightvessel and the Sand-head, or she may pass that lightvessel close-to on either side, and bear up for the Downs.

**Tides.**—At the North Foreland it is high water (full and change) at about 11h. 15m.; at Deal nearly the same. At Ramsgate the rise of tide at springs is 12 to 15 feet; at neaps 10 to 12 feet. The stream in the Downs continues to run until 2h. 30m., and the flood runs nearly for 6 $\frac{3}{4}$  hours.

Strong north-easterly winds sometimes keep back the tide more than an hour, and southerly winds the contrary.

About 3 miles E.S.E. from the North Foreland, during the first half-flood upon the shore, the stream sets S.S.W., and soon after it is slack water, after which it sets W.N.W. and N.W. until half-ebb; so that the ebb-tide out of Margate road runs three hours eastward before the tide of ebb runs southward through the Downs; for this reason, if a ship be in Margate roads, with a wind at S.W., sail should not be made, to beat and go round the Foreland until half-ebb, when the tide will be going to windward through the Gull Stream. Spring

\* South Foreland high lighthouse over the middle of Old Stairs bay, S.W.



tides run about  $1\frac{1}{2}$  miles in an hour; neaps about half a mile. When low-water slack begins off the Foreland in a gale of wind, the tide frequently sets towards all points of the compass.

### SOUTH FORELAND TO BEACHY HEAD.

The South Foreland consists of extremely lofty chalk cliffs, having on their face layers of flint in horizontal lines. Upon the summit of the land are two lighthouses, showing *fixed* lights, as noticed in the preceding section, page 1.

**DOVER.**—Dover is about 3 miles W.  $\frac{3}{4}$  S. from the South Foreland, and is easily recognised by its historic castle, standing on an eminence on the eastern side of the town. It has a good tidal harbour, the outlet of which faces the S.E. The piers are separated from each other only by an interval of about 140 feet, the entrance is therefore very narrow, and with gales from the westward requires careful steering, as the sea breaks across the channel to some distance off. The direction of the channel is generally to the N.N.W. Efforts are being made to improve the port, with a view of rendering it accessible to vessels of a larger size than it can at present accommodate. The best time for entering the harbour is about  $1\frac{1}{2}$  hours before or 2 hours after high water, and it is strongly recommended always to employ a pilot.

The outer harbour dries an hour before low water, but has a depth of 17 feet at high-water springs, and from 10 to 13 feet at neaps; the depth is said, however, to be very uncertain, and greatly dependent upon the winds, which at times make a considerable difference in the flow. In the Pent, and in the inner harbour, there is only a foot less water, the sills of the gateways being a foot above the level of the outer harbour. A patent slip-way has been constructed in the Pent, 450 feet long, and 115 feet length of cradle; it is worked by steam, and it is capable of taking a vessel of 500 tons.

The Admiralty pier runs out S.S.E. from Cheeseman head, about 167 yards westward of the entrance to the harbour, and is at present 533 yards in extent. Vessels of large draught can go along both sides of the pier at any time of tide; and fresh water can be obtained in abundance. The tidal trains go regularly on to the pier to meet the continental mail steamers.

The buoy off the extreme end of the pier in 6 to 7 fathoms water, should always have a wide berth given to it on account of the strong eddy in its vicinity. At half flood the eddy makes to the westward out of Dover bay, and meeting the offing stream running eastward at the extreme end of the pier, causes a heavy sea in westerly gales; but thence to the harbour the water in the space sheltered by the pier is smooth.

During north-easterly winds, Dover bay is much frequented by coasters bound northward, the usual anchorage being abreast the esplanade, with the South Foreland lighthouses shut in by the hills; but small steamers anchor closer inshore. With easterly winds the mail packets either anchor off or haul alongside the western side of the pier. The great extension of the Admiralty pier affords shelter from winds westward of W.S.W., but though with these winds a heavy swell is experienced, it is not dangerous, as the strong eddy caused by the breakwater sets westward, and thus becomes a weather tide.

The anchorage however on each side of the pier should only be considered temporary, especially for large vessels, or those without steam power, for the shelter is not great, and the holding-ground not good; therefore immediately the pier becomes a lee shore, vessels should quit the anchorage.

On the north end of the north pier of the harbour there is a private flagstaff for the purpose of acknowledging vessels' numbers as they pass the port, either outward or homeward bound, and they are immediately reported by telegram to Lloyd's.

A lifeboat is stationed at Dover.

**Lights.**—Two *red* tidal lights, of unequal heights, are exhibited from a staff on Dover south pier-head, and a small low *red* light on the north pier-head. This latter red light, and a similar *red* light on the low outer corner of the south pier, are shown when the depth at the entrance is 7 to 10 feet; the two red lights on the staff on the south pier, and the low red light on the north pier when it is more than 10 feet; and the single low red light on each pier when it is 10 to 7 feet. These lights only point out the position of the piers, and do not indicate the channel.

A *green* light, shown all night from the cross wall near the clockhouse, when seen between the piers, leads into the fairway to and up the harbour. A *blue* light is exhibited at the extreme end of the Admiralty pier, and a bell is sounded in foggy weather.

**Tidal Signals.**—It is high water at Dover (full and change) at 11h. 12m.; equinoctial tides rise  $20\frac{1}{2}$  feet, ordinary springs  $18\frac{3}{4}$  feet, and neaps 15 feet.

During day a red flag, with a black ball under it, is hoisted while the depth at the entrance is 7 to 10 feet; the red flag alone when it is 10 to 13 feet; and the ball over it when 13 feet and upwards.

No signals are made between 7 feet at ebb and 7 feet at flood; and whenever, at other times, the harbour is inaccessible to vessels, the flag is hauled down, or the light or lights on the south pier extinguished.

**FOLKESTONE.**—Folkestone is about  $5\frac{1}{2}$  miles W.  $\frac{1}{4}$  S. from Dover, and has a small but shallow harbour, suitable for boats and small craft. This harbour has been deepened by the railway company, to which it belongs, to enable it to receive the steamers plying to Boulogne; but it is too shallow for vessels, except those of the smallest kind, and its entrance is awash at low water.

**Lights.**—A *fixed red* light, elevated 37 feet above high water, and visible in clear weather at 6 miles, is shown from the lighthouse on the south pier-head, while the depth is 10 feet between the pier-heads. When it is blinked at intervals, it indicates that caution is necessary.

A *white* light is shown under this red light while the depth is above 16 feet.

When these lights are not exhibited, there is less than 10 feet—or there is some obstruction in the fairway—or the harbour is inaccessible on account of the weather.

An iron skeleton lighthouse stands on the extremity of the new pier, S.  $\frac{1}{4}$  W. (westerly), 212 yards from the lighthouse on the south pier-head, and exhibits at 31 feet above high water a *fixed* light, visible in clear weather 6 miles. The light shows *green* seaward over the arc W. by S.  $\frac{3}{4}$  S. to E.  $\frac{1}{2}$  S. ( $155^\circ$ ), which lines of bearing (from the light) pass about 65 yards outside the Oak End rocks on the west side of the pier, and the same distance outside the Mole head rocks on the east side; and *white* northward of these limits or towards the land. The light changing from green to white indicates that the vessel is in the stream of danger.

**Tide Signals.**—It is high water at Folkestone (on full and change) at 10h. 46m.; springs rise 20 feet, and neaps  $15\frac{1}{2}$  feet. The range of neap tides is 12 feet 10 inches. In the harbour the depth is 17 feet at high water springs, and 13 feet at neaps. Strangers should not attempt to run in without a pilot's assistance.

A red flag hoisted half-mast on the flagstaff on the south pier-head indicates



that the depth between the pier-heads is 10 to 14 feet; if hoisted close up the depth is 14 to 16 feet; when more than 16 feet water, a black ball is shown under the red flag.

When the flag is at the base of the flagstaff, it indicates that caution is necessary. When it is not shown, the depth between the pier-heads is less than 10 feet,—there is some obstruction in the fairway,—or the harbour is inaccessible on account of the weather.

The anchorage off Folkestone is very indifferent, and too much exposed to be used other than as a temporary riding when waiting for the tide to enter the harbour. The best berth is with the pier lighthouse in one with the eastern houses near the north side of the harbour, bearing North, and the church in one with the terrace on the beach west of the clockhouse. Vessels may anchor off here in 12 or 14 fathoms, but near it to the westward, a ledge of rocks runs off from the shore, to which a nearer approach than the depth of 12 or 14 fathoms should not be made, there being 12 to 10 fathoms water close to it;—a good mark to clear all danger is the South Foreland well open of Dover cliff.

As a guide for vessels sailing in the vicinity of Folkestone, to enable them to avoid the rocks extending from the shore, the high light at the South Foreland is masked northward of the bearing from it of W. by S., so that immediately the light disappears vessels are to stand off shore. If drawing more than 14 feet, and sailing near the South Foreland, the old rule should be followed, which is, to keep the lower light in sight when approaching the shore.

When standing to windward off Folkestone, the Varna shoal should not be approached nearer than the depth of 16 fathoms, nor the Ridge shoal than 18 fathoms.

**Newcome Bank.**—From Folkestone to Dungeness the distance is 11 miles in a W.S.W. direction. The intervening coast forms a semicircular bay, known as Dungeness East road, which bends inwards about  $3\frac{1}{2}$  miles from the above mentioned line of bearing, and is fronted by a flat of  $1\frac{1}{2}$  to 4 fathoms, which is abreast of Dymchurch shoals out eastward to the distance of 2 miles from high-water mark; immediately off the edge of this the water deepens to 8 and 10 fathoms. A chequered *black* and *white* buoy, named 'Newcome,' placed near the southern extremity of this flat ( $1\frac{1}{2}$  miles N.E. by E. from Dungeness lighthouse, and  $\frac{3}{4}$  of a mile E. by S. from the first battery northward of the Ness) should always be passed on its east side by vessels running up or down Channel.

The **Roar Bank** is about  $2\frac{1}{2}$  miles in length, nearly parallel to the shore at the distance of about 1 mile from it, and is 9 to 12 feet under water. From its south-west end Romney mill bears N.W.  $\frac{3}{4}$  N. distant  $2\frac{1}{4}$  miles, and from its north-east end the same mill bears W.  $\frac{1}{4}$  N., distant  $2\frac{1}{2}$  miles.

**Swallow Bank.**—The Swallow bank, which is separated from the Roar bank by a depth of  $2\frac{1}{4}$  to 5 fathoms, is in shape similar to a pear, and has 16 feet water upon its shoalest part at low tide, but 21 feet at 2 hours' flood. It is distant  $2\frac{2}{3}$  miles from the second battery northward of the Ness, and lies 3 miles S.E. by S. from Romney church, and nearly the same distance N.E.  $\frac{1}{4}$  E. from Dungeness lighthouse. Lydd church open north of the second battery northward of the Ness, leads southward of it in 31 feet water; and Beechborough summer-house in one with Hythe church or Dungeness lighthouse, W.S.W., will clear it on its east side.

With the wind from any point between N. by E. northerly to W. by S., Dungeness East road affords good shelter to all vessels in from 4 to 12 fathoms upon moderately good holding ground. The best position is with Lydd church open northward of Lydd north-east mill, and the lighthouse bearing S.W. by W.  $\frac{1}{4}$  W., in 7 fathoms water.

**DUNGENESS.**—Dungeness is a low, steep, beachy point, lying W. by S.  $\frac{3}{4}$  S.

20 $\frac{1}{2}$  miles from the South Foreland, and is distinguishable by a round lighthouse, painted with alternate red and white bands, from which, at an elevation of 107 feet above high water, is exhibited a *fixed* electric light, visible 15 miles.\*

Dungeness point is steep, there being immediately off it a depth of 15 fathoms, notwithstanding which vessels passing it should not get into a less depth than 17 or 18 fathoms. The strongest tide runs in 15 fathoms, and the water rises with spring tides about 4 fathoms.

The West bay of Dungeness affords very good anchorage against north-easterly winds, and is preferable to Dover road. The marks for the best ground (in 6 fathoms) are New Romney church-tower in one with Lydd church, and the mill on Fairlight Down in one with, or open westward of Fairlight church. From this anchorage Dungeness light will bear about E.  $\frac{1}{4}$  S. Small vessels may run further in towards the beach, if a sudden shift of wind be guarded against.

**Stephenson Shoal.**—In the West road of Dungeness is a dangerous bank known as Stephenson shoal, which requires considerable care to avoid. Its eastern end lies 3 $\frac{1}{4}$  miles W.  $\frac{1}{2}$  S. from Dungeness lighthouse, and it thence extends nearly three-quarters of a mile in the same direction, its west end being distant from the lighthouse about 4 $\frac{1}{2}$  miles. Upon it the depth varies from 17 to 24 feet, and close to it all round it is as much as 6 and 7 fathoms. To clear its eastern end in 5 fathoms, bring the east mill at Lydd in one with No. 4 coast guard-house, bearing N.N.E.  $\frac{1}{2}$  E.,—its western end in 27 feet, Rye church in one with New church-spire near Rye harbour, N.N.W.  $\frac{3}{4}$  W., or the tower of New Romney church open westward of Lydd Smock mill, as this mark will lead considerably westward of it,—and its south side, Dungeness lighthouse E. by N.  $\frac{1}{4}$  N., the South Foreland and Dungeness lighthouses in one, Fairlight mill in one with Fairlight church, or Shakespeare cliff well open southward of Dungeness lighthouse. This bank should not be approached by passing vessels, nearer than the depth of 18 fathoms.

**RYE.**—Rye harbour is about 8 miles N.W. by W. from Dungeness, and is but little frequented except by coasters, being too shallow to admit vessels drawing more than 9 feet, and we believe that these lie aground in the channel at low tide. It is one of the *Cinque Ports*, and was formerly of considerable importance, but is now so shallow as to be practically useless for large ships. When entering it is necessary to have a pilot's assistance. The channel is, or was, indicated by buoys.

**Lights.**—Two small *white* lights are shown on the north bank of the river, while the depth on the bar is 10 feet and upwards. They are distant from each other 540 feet in a N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E. direction, and are visible 5 miles; when in line they lead over the sand in front of the harbour in the same depth of water that the harbour signals indicate. Two small *red* tide lights are also shown on the east side of the entrance; one 36 fathoms from the old pier-head, the other on the Dolphin. And, in addition to these, a small *green* light is shown at the extremity of the new groin, at the western entrance of the harbour, from half-flood to about half-ebb. The *white* lights

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\* A *red* light marking the anchorage inshore *westward of Dungeness*, is shown from a window below the lantern of the lighthouse, with that building bearing East; and a *red* light marking the anchorage *eastward of the Ness* is shown from the lantern with the lighthouse bearing S.W. by W.  $\frac{1}{2}$  W.

A powerful fog-horn has been established at Dungeness. Its blast is audible over an arc of 210°, or from N.E. by E.  $\frac{1}{4}$  E. (round south) to W.  $\frac{1}{4}$  N., and *vice versa*, so as to point in every direction between those bearings *once in each minute*: the duration being 5s. with an interval 20s. between each blast.

A beacon mast, 50 feet high, with two globes on it, stands on the Ness, a few yards above high water.



in one lead into the entrance, between the *green* light on the groin and the *red* light on the east pier-head, which are distant from each other 87 yards N.E. and S.W.

**Tides and Tidal Signals.**—It is high water (full and change) in Rye bay at 11h. 20m.; springs rise 22 feet, and neaps  $17\frac{1}{4}$  feet. Springs rise at the point 16 feet, at the town,  $12\frac{1}{2}$  feet, and at the float sluice  $11\frac{1}{2}$  feet. The depth in the harbour at high water springs is 15 and 16 feet, at neaps 10 and 11 feet. The flood runs in round the beach with a velocity of 6 knots, and its rate lessens inside. It would not be prudent to leave the harbour during the strength of the tide.

The Telegraph at the entrance of the harbour, near the flagstaff, shows the flowing of the tide. The frame and shutters are black, and when not in use hang vertical and appear all black; when in use the shutters are canted horizontally, so as to show a circle of light through the frame, and are worked as follows:—When the depth is 8 feet one shutter is canted; when 9 feet both shutters are canted; when 10 feet the flag is hoisted; when 11 feet one shutter is canted; when 12 feet both shutters are canted. So that the shutters without the flag denote under 10 feet, and with the flag above 10 feet water.

When the depth is more than 12 feet red flags are hoisted on the Telegraph flagstaff, as follows:—One flag hoisted half-mast denotes 13 feet; and hoisted up 14 feet. Two flags half-mast denote 15 feet, and hoisted up 16 feet.

A black ball is hoisted on the ball-pole, at the harbour flagstaff, in bad weather or low tides, to signify that the pilots cannot get off, and that the harbour cannot be approached with safety by strangers. A blue burgee on the ball-pole signifies high water at the pier-head.

**Directions.**—Approaching Rye harbour look out for the black buoys on the low water western edge of the channel, and having left them on the port hand, and the red and white buoy on the starboard hand, steer to pass to the south-west of the red and white buoy at the end of a low stonework extending 600 feet from the Dolphin, and over which there is the same depth of water that the tidal signals indicate. Thence the two tide lights in one lead up eastward of the pilots' houses on the point, leaving all the broom beacons on the low stonework to starboard, and the triangular beacon and the beach to port. When as far as the pilots' houses either anchor, or make fast alongside one of the seven berthing places on the eastern shore.

**Lifeboats.**—A lifeboat is stationed at Hastings, Winchelsea, and Rye.

**BOULDER BANK, &c.**—On the western side of Rye bay are several shoals, on account of which this part of the coast should have a good berth. Of these the outermost and most dangerous are those named Boulder and Tower Knoll; the latter is 6 feet under water. The Boulder bank is a ridge of sand with several rough spots of coarse gravel and stones upon it, lying about  $1\frac{1}{2}$  miles off the land abreast the eastern side of Fairlight hills; from it a narrow sand ridge of  $3\frac{1}{2}$  to 4 fathoms extends 7 miles to the W.S.W., or nearly to the meridian of Hastings. This ridge has a depth of 6 to 7 fathoms close to its edge, and southward of it the sea deepens rapidly to 9, 12, and 16 fathoms.

To clear the Boulder on its south side, bring Bexhill just open of St. Leonards, or St. Leonards well open of the east cliff at Hastings; and on its south-west side Fairlight mill open westward of the semaphore. A mark that has been given to clear it on the south-east side is:—Playden steeple in one with the turret of Rye church; but this appears to lead almost close to its edge. When Fairlight church bears North, a vessel of 19 feet draught may cross the sandy ridge forming the prolongation of the Boulder Bank to the W.S.W., and may afterwards tack inshore abreast Fairlight cliffs in any convenient depth.

As a general rule, when between Dungeness and Hastings, it will be prudent not to get into a less depth than 12 fathoms, to insure giving sufficient berth to the Boulder and other shoals. These banks are, however, so close to the land that they are quite out of the way of vessels beating up or down Channel. If the land be not approached nearer than to bring Dungeness lighthouse bearing E. by N.  $\frac{1}{4}$  N., a ship will be clear of all danger.

**HASTINGS and ST. LEONARDS.**—Hastings is about 8 miles westward of Rye; it lies immediately westward of the sandstone cliffs, the greater part of the town being built in the valley between East hill or Rock-a-nor point and West hill, on which stand an old castle (now in ruins) and three conspicuous windmills. St. Leonards is the continuation of the town of Hastings in a westerly direction, and consists of terraces of well-built houses. Before these is the roadstead for vessels, which is not recommended, being very much exposed to the heavy seas prevalent when the wind is southward of West. The usual place of anchorage is with Fairlight high coast-guard house well open of the cliff.

**Lights.**—The shore at Hastings being flat and rocky is a bad beaching place for boats; the best, however, is abreast the fish market, nearer the eastern part of the town, and for the guidance and safety of the fishermen, in running on shore, two *fixed* lights have been established on a N.N.E. and S.S.W. bearing, 300 yards apart. The upper light, *white*, is shown at 60 feet above high water from the side of West hill over the houses in the town; and the lower light, *red*, at 30 feet from an octagonal building near the fish market on the beach. Also, a *green* light, visible 4 miles, is exhibited at a position 50 yards within the end of the pier, at Hastings.

From Hastings the shore runs westerly to Pevensey, and then turns south-westward to Beachy head. It is a shingle beach throughout, and studded here and there with small rocky heads, especially near Hastings, where are the New-head, Pier, and Goat rocks, extending nearly half a mile off shore. Between Pevensey and Beachy head the coast trends inwards and the land is very little above the sea, but from Pevensey towards Hastings it becomes elevated, rising very high in the interior. The bottom, generally speaking, is shoal and flat, and the depth from the offing decreases from 14 and 10 fathoms gradually to the shore, so that the land hereabout may be made by the lead; care, however, is necessary to avoid the Royal Sovereign, Southern-head, Horse of Willingdon, and other shoals about 7 miles eastward of Beachy head.

**ROYAL SOVEREIGN SHOALS.**—The centre of these shoals, on which the depth is only 9 feet, lies E. by S.  $\frac{1}{4}$  S. from the southern extreme of Beachy head, distance  $7\frac{1}{4}$  miles;  $10\frac{3}{4}$  miles S.W. by W.  $\frac{2}{3}$  W. from Fairlight mill, and S. by E.  $\frac{3}{4}$  E.  $5\frac{3}{4}$  miles from Pevensey church. The long north-eastern mark for it is Fairlight mill in one with the eastern part of the cliff on which the ruins of Hastings castle stand, and Hailsham church one-third nearer to Westham church than to Hankam windmill. By keeping Seaford cliff in sight southward of the pitch of Beachy head, vessels will pass at least 2 miles *southward* of the shoals. Fairlight mill in one with the north-western part of the cliff eastward of Hastings will lead *eastward* of them; and Willingdon church on with the north end of Willingdon chalk-pit will carry *northward* of them. The shoals are very perceptible during spring tides, and in bad weather the sea breaks heavily upon them. They are now guarded by a large bell buoy (striped *black* and *white*, vertically) with staff and cage, moored in 6 fathoms, about half a cable southward of the 9-foot patch.

The *Southern head*, which is about  $1\frac{2}{3}$  miles southward of the above-mentioned buoy, is a rocky patch of 4 fathoms least water, and about one-third of a mile in length from S.S.W. to N.N.E. The depth immediately off its southern edge is



8 fathoms, and between it and the 9-foot patch of the Royal Sovereign shoal, 7 to 10 fathoms. Its marks are, Beachy head signal-house N.W. by W.  $\frac{1}{4}$  W. 7 miles, and Pevensey church N. by W. 7 miles. There are several other 4 to 5-fathom spots between this shoal and the buoy.

About  $1\frac{1}{4}$  miles to the N.E. of the 9-foot patch on the Royal Sovereign shoals are several patches of  $4\frac{1}{2}$  fathoms, known as the *Ratten ledges*; and to the N.W. by W. 2 miles of the same patch, is the *Horse of Willingdon*, a shoal of 3 to  $3\frac{1}{2}$  fathoms. Between the Royal Sovereign shoals and the Horse of Willingdon, there are two patches of  $3\frac{1}{2}$  to 5 fathoms, named *Kinsman Nab* and *Hutchin Nab*; and a little Westward of the Horse of Willingdon is another small patch, of  $4\frac{1}{2}$  fathoms, named *Elphick Tree*.

All the above shoals as well as those of the Royal Sovereign and Southern head will be cleared, by not going into a less depth than 16 fathoms at low water, or if bound westward from off Dungeness, by not steering westward of W. by S. before Beachy head lighthouse or Seaford cliff becomes visible, bearing N.W. by W. If sailing eastward, when the town of Battle appears in one with that of Bexhill, about N.N.E., there will be no danger of striking on the shoals and the course may be directed E.  $\frac{3}{4}$  N. for Dungeness.

**Holywell Bank.**—This is a rocky shoal extending from Rockyfoot point (Beachy head) in a S.W. direction. It runs nearly parallel with the trend of the coast, and terminates at two-thirds of a mile from the watch-house on Beachy head; the depth on all parts of the bank is 4 to 6 feet, and very close both within and without it 12 feet. The little spire of Hurstmonceaux church in one with the western part of Westham church leads between Holywell bank and the Royal Sovereign shoals.

**Eastbourne Road.**—About half a mile from the north end of Holywell bank is Eastbourne roadstead, where vessels anchor with winds from West northward to N.E. by E., and are sheltered by the high land of Beachy. It is imprudent to go near the shore, on account of the rocky bottom there prevalent, nor should the anchor be cast northward of the town, for there the ground is foul; southward of the town, and above a mile from the shore, there is fine, clear sandy bottom, in the depth of 4 to 7 fathoms.

A lifeboat is stationed at Eastbourne.

**BEACHY HEAD LIGHT.**—Beachy head, about 18 miles W.  $\frac{3}{4}$  S. from the point of Fairlight, and 30 miles westward from Dungeness, is a very remarkable headland, being a high bluff chalk cliff, which may always be readily recognised by a distant observer by the seven white cliffs westward of it. On a spot known as Belletoute, near the summit of the second cliff westward of the head, stands a white lighthouse, the lantern of which is about 285 feet above the level of the sea. It exhibits a powerful light, *revolving every two minutes* and visible in clear weather at the distance of 23 miles. During night, vessels from eastward will open the light, when it bears N.W. by W., and whether bound up or down Channel (when eastward of Beachy head, and within 3 leagues of it) by keeping the light open, will pass southward of all the Royal Sovereign shoals.

**DIRECTIONS.**—The direct course, from the Downs outward, past the South Foreland, is S.W.  $\frac{3}{4}$  S. about 6 miles, in from 9 to 15 fathoms water, and thence to Dungeness W. by S.  $\frac{3}{4}$  S. nearly 21 miles, observing to allow for tide, &c. Beachy head bears from Dungeness W.  $\frac{1}{4}$  S., distant 30 miles; but the course from one mile South of Dungeness to 2 miles South of the Outer Horse, or Southern head, is W.  $\frac{7}{8}$  S., and the distance 23 miles.

When turning to windward between the Varne and the shore, while eastward of

Folkestone, vessels may stand into 11 or 10 fathoms and off to 16 fathoms (or until Dungeness lighthouse bears West). When Folkestone church bears N.  $\frac{1}{2}$  E. there will be no danger of striking on the Varne, and Dungeness lighthouse may be brought to bear N.W. by W. Between Folkestone and Hythe the shore should not be approached nearer than the depth of 14 fathoms, on account of the rocks lining the coast, but between Hythe and Dungeness it may be approached into 12 fathoms, and vessels may stand off it into 16 or 20 fathoms.

Dungeness may be rounded at a moderate distance. The strongest tide runs in 15 fathoms. Ships bound down Channel, and meeting with westerly winds, may anchor eastward of the Ness in 10 or 12 fathoms, the Ness bearing S.W. by W., or W.S.W., observing to keep the Hope Land (eastward of Dover) open; they may also anchor westward of the Ness with N.E. winds in 7 or 8 fathoms, the Ness bearing E.  $\frac{1}{4}$  S.

Vessels working down Channel, when westward of Dungeness, must be careful not to stand in to the land, until westward of Fairlight; for the shore, till then, is not only flat a long way off, but there are several sandbanks of 12 and 16 feet under water, and one very dangerous (the Tower Knoll) having a depth over it of only 6 feet. Stephenson shoal should not be approached nearer than the depth of 10 fathoms (when Dungeness lighthouse will bear E. by N.  $\frac{1}{4}$  N.); but when westward of that shoal small vessels may venture nearer the land into 6 or 5 fathoms, as the soundings decrease gradually. When Fairlight church bears North, the shore may be approached into 7 fathoms, which is distant about 3 miles from it; vessels may also stand towards Bexhill into 9 fathoms, or if not drawing much water into 6 or 5 fathoms, the soundings being gradual. Between Bexhill and Beachy head the land should not be approached nearer than the depth of 18 fathoms. During the night, or thick weather, no ship should stand into less than that depth, unless her situation be well ascertained.

**TIDAL STREAMS.**—The following remarks upon the tides are extracted from the "Channel Pilot," published by the Hydrographic Office of the Admiralty, 1869:—

"The Channel streams at each end of Dover strait set uniformly in a direction towards Dover while the water is rising at that place, and away from it when it is falling. A vessel, therefore, if she carries the eastern stream or flood as far as Hastings, will have a continuation of easterly tide for 4 hours longer; and if sailing 8 knots, will nearly carry it to the North Foreland. If turning to windward, and she can get to the eastward of Hastings by high water, she may then advance as far as the West road, Dungeness, before the tide makes to leeward; but if not to windward of Hastings by an hour after high water, she will get no farther and may either keep under way or anchor for the tide, as convenient.

Accidents of a fatal nature have occurred to ships running up Channel by being lost on the coast of France, in the vicinity of Boulogne, which have been attributed to the rotary action of the stream; but there is more reason to believe that they have been set to the eastward of their reckoning, and deeming themselves westward of Dungeness have been steering East, whilst they have been 10 miles beyond it, when probably the stream to the S.W. has begun to run, and catching them on the port bow, has set them over on the French shore. The mariner, therefore, will do well to study the set and turning of the stream, and on no account to neglect the lead.

It is high water, full and change, at Beachy head at 11h. 20m.; springs rise 20 feet, and neaps 15 feet. The stream in the offing begins to run to the east-



ward at low water, and continues to do so until high water, a similar law applying to the western stream.

At Eastbourne it is high water at 11h. 3m.; springs rise  $21\frac{1}{4}$  feet, neaps 17 feet; at Hastings at 10h. 53m., rise 24 feet and  $17\frac{1}{4}$  feet; Dungeness at 10h. 45m., rise  $21\frac{3}{4}$  feet and 19 feet; and Boulogne at 11h. 25m., rise 25 feet and  $19\frac{1}{2}$  feet.

Upon the Varne and Ridge it is high water at 10h. 40m.; but the north-eastern stream does not commence there until  $4\frac{1}{2}$  hours flood, nor the western till  $4\frac{3}{4}$  hours ebb; making  $6\frac{1}{2}$  hours of north-eastern and  $5\frac{1}{2}$  hours of south-western tide.

Strong gales from the westward will prolong the north-eastern stream nearly an hour, and retard proportionably that to the south-westward; so that on some occasions, on the Ridge especially, 8 hours north-eastern tide, and only 4 hours to the south-westward, have been found.

Between the Vergoyer and the French shore the tide makes on an average one hour sooner than it does in the offing, both on the ebb and flood.

From Dover to Hastings the duration of the flood is always considerably less than the falling tide, the former flowing  $5\frac{1}{4}$ h., and the latter ebbing 7h.; but to the westward of Hastings, at Eastbourne, the duration of the two tides begins to equalize, the tide flowing 5h. 45m., and ebbing 6h. 40m.

Inshore, between Hythe and Dungeness, there will be found a slack during the strength of the eastern stream; also from Hastings to Beachy head the flood runs easy. During the western stream the tide is easy between Hythe and Sandgate as far as Mill point; and between Dungeness and Fairlight there is a slack which might be taken advantage of. Between Pevensey bay and the Holywell bank the western stream commences at half an hour before high water; and over the bank, and in Whitbread hole, there is a strong eddy settling down after half flood.

About one mile S.S.E. of the South Foreland lighthouse, the stream begins to set to the eastward about 1h. 30m. before high water on the shore at Dover, and runs from N.E. by E. to E.N.E. about  $5\frac{1}{2}$  hours, or till 4 hours after high water; it then turns and sets W. by S.  $\frac{3}{4}$  S. about 7 hours. At Dover the flowing stream seldom continues more than 5 hours, and sometimes scarcely so much; it is nearly the same at Ramsgate. To the northward of the South Foreland the streams change their direction to N.E.  $\frac{1}{2}$  N. and S.W.  $\frac{1}{2}$  S.

In the Downs the north-eastern stream begins about 1h. 20m. before high water at Dover, and continues to run 5h. 30m.; it then turns and runs in a contrary direction till 2 hours before the ensuing high water.

In the Gull Stream, one mile N.N.W. from the Bunt head, the northern stream begins about 1h. 30m. before high water at Dover, and continues for 6 hours; it then turns and runs in a contrary direction till  $1\frac{1}{2}$  hours before the ensuing high water. Its direction is N.E.  $\frac{3}{4}$  N.; but the last hour changes to E.N.E., and even to the southward of East; the last hour of the southern stream changes from S.W.  $\frac{3}{4}$  S. to W.S.W., and even to the northward of West."

## STRAIT OF DOVER.

The navigation of the English channel in the vicinity of Dungeness is very much impeded by banks of sand and shingle, the principal and most dangerous of which are the Ridge or Colbart, the Varne, and the Bassure de Baas, there being as little as 6 feet water upon the shoalest part of the first-mentioned shoal, and at the same

time not more than 10 to 17 feet upon portions of the others. On the Vergoyer the water is generally deeper, although there is a small patch of 12 feet near its northern end.

**RIDGE SHOAL.**—The Ridge and Varne sands lie exactly in the fairway of the strait of Dover at nearly equal distances from the English and French coasts, and almost parallel to each other, the Ridge, however, extending considerably more southward than the Varne. Between the sands the depth is 16 to 18 fathoms; in the channel between them and the English coast 17 to 12 fathoms: and between them and the French coast 12, 25, and 11 fathoms, the latter being close to the edge of the Bassure de Baas. It is requisite to be very careful when in their vicinity, and to keep the lead constantly going, their position rendering them very dangerous; the usual plan of ships sailing down Channel is to keep over to the English coast, as they are thus enabled the better to avoid them.

The south end of the Ridge (9 fathoms) is in lat.  $50^{\circ} 48' N.$ , long.  $1^{\circ} 16\frac{1}{2}' E.$ ; thence it extends  $9\frac{1}{2}$  miles to the N.E.  $\frac{1}{4} E.$ , or as far as lat.  $50^{\circ} 57' N.$ , long.  $1^{\circ} 23' E.$ , being about 2 miles wide in its broadest part. On the north-east end of the bank the depth is 10 to 4 fathoms; on its centre 5 to 2 fathoms, and near its south-west end not more than 6 feet with ordinary tides: this part is consequently the shallowest. Close to the bank on all sides is a depth of from 15 to 11 fathoms.

The bearings for the 6-foot patch are Varne lightvessel N.  $\frac{1}{4} E.$ , nearly 5 miles; cape Grisnez E. by S.  $\frac{1}{2} S.$ , 11 miles; cape Alprech S.S.E.  $\frac{1}{2} E.$ ,  $13\frac{1}{2}$  miles; mount Lambert semaphore S.E.  $\frac{1}{2} S.$ , 15 miles; Dungeness lighthouse N.W. by W.,  $13\frac{1}{2}$  miles; and Dover castle N.N.E.,  $17\frac{1}{4}$  miles. Some other marks for this 6-foot patch are Playden steeple, its own breadth open southward of Dungeness lighthouse; and mount Couple (a remarkable conical hill in the interior, near Audenbert) a little open southward of the Mortar battery on cape Grisnez.

The marks for the north-east extremity of the Ridge (7 fathoms) are cape Grisnez, S.E.  $\frac{1}{4} S.$ ,  $8\frac{3}{4}$  miles; the high trees at the back of Hythe in line with the Swiss terrace at Sandgate, N.N.W.  $\frac{1}{2} W.$ ; and the Varne lightvessel W. by N.  $\frac{3}{4} N.$ , 4 miles.

From the south-west end of the Ridge the semaphore on mount Lambert (a conspicuous hill near Boulogne, with a fort on it) appears a little open northward of the Hôtel de Ville, in the upper town of Boulogne.

To pass *southward* of the Ridge, keep mount Lambert in one with the dome of the new cathedral at Boulogne S.E.  $\frac{1}{2} E.$ , or the lighthouse on cape Grisnez East, either of these objects will clear it in 9 fathoms. To pass *westward* of it, the Swiss terrace at Sandgate should be brought between the two chalk-pits N.  $\frac{1}{3} E.$ ; and *eastward* of it Wahnor road mill should be kept in sight eastward of the Hope land, or Outreau church be brought to touch the eastern end of the wood south-westward of St. Etienne church.

**VARNE SHOAL.**—This sand is about 2 miles northward of the Ridge, and is not so extensive as that shoal, being not more than  $5\frac{1}{2}$  miles in length from the depth of 9 fathoms at each end. In breadth it is about  $1\frac{1}{4}$  miles where broadest. In its shallowest part is a depth of not more than 9 feet at low tide; the bank ought therefore always to have a wide berth given to it. Close to it the soundings average 16 to 12 fathoms.

The north-east end of the Varne bears S.  $\frac{1}{2} W.$ ,  $8\frac{1}{4}$  miles from Dover castle, and S. by W.  $\frac{3}{4} W.$ ,  $8\frac{1}{4}$  miles from the South Foreland upper lighthouse. Its south-west end lies S.S.W.  $\frac{1}{4} W.$ ,  $11\frac{3}{4}$  miles from Dover Castle, and W. by N.  $\frac{1}{2} N.$ , 12 miles from Dungeness lighthouse. The marks for its centre are the fir-



trees at Paddlesworth\* twice their own breadth open eastward of Folkestone church, and the guardhouse on cape Blanenez exactly in one with the top of the chalk cliff beneath it. The church at Folkestone between the chalk-pits at Paddlesworth nearly N.W. by N., leads northward of the Varne in 7 fathoms: Lymme windmill just in sight westward of Lymme church carries westward of it; and the mill on Fairlight down, one-third nearer to Lydd church than to Dungeness lighthouse, leads between it and the English coast.

The marks for the shoal spot on the Varne (8 feet) are the South Foreland N.N.E.,  $8\frac{1}{4}$  miles, and Dover castle N.  $\frac{3}{4}$  E.,  $8\frac{1}{2}$  miles. Over the bank both at spring and neap tides are strong rippings, and during tempestuous weather such a heavy sea that no vessel can then cross it in safety even at high tide.

**Lightvessel.**—The Varne lightvessel lies in 16 fathoms, about a mile W. by N.  $\frac{1}{2}$  N. from the depth of 7 fathoms on the south-west end of the shoal, and exhibits at 38 feet above the sea a *revolving red* light, which attains its greatest brilliancy every 20 seconds, and in clear weather is visible from the distance of 10 miles. It carries a ball at the masthead during day, and from it Dungeness lighthouse bears W. by N.  $11\frac{3}{4}$  miles; Folkestone church N.  $\frac{1}{4}$  W., 9 miles; South Foreland high lighthouse N.E.  $\frac{3}{4}$  N.  $12\frac{1}{2}$  miles; North-east Varne buoy, N.E. by E.  $\frac{1}{4}$  E.  $5\frac{4}{10}$  miles; and cape Grisnez lighthouse S.E.  $\frac{2}{3}$  E.  $12\frac{1}{2}$  miles. A watch buoy is moored in 9 fathoms S.E. by E., eight-tenths of a mile from the lightvessel.

**Buoy.**—A large red spiral buoy, surmounted by staff and ball, and marked N.E. Varne, is moored off the north-east end of the shoal in 13 fathoms at low water; with Dungeness lighthouse bearing West (northerly) 16 miles; Folkestone church N.W.  $\frac{3}{4}$  N. 8 miles; South Foreland high lighthouse N.N.E. 8 miles; cape Grisnez lighthouse S.S.E.  $\frac{1}{4}$  E.  $11\frac{3}{4}$  miles; and the Varne lightvessel S.W. by W.  $\frac{1}{4}$  W. 5 miles.

**BULLOCK.**—This small bank (about  $2\frac{1}{2}$  miles in extent from E. by N.  $\frac{1}{2}$  N. to W. by S.  $\frac{1}{2}$  S.) lies 11 miles S.  $\frac{1}{4}$  W. from Dungeness, and about  $19\frac{1}{2}$  miles N.W. by W.  $\frac{1}{2}$  W. from cape Alprech. The depth over it is 9 to 10 fathoms water, and almost close to it all round 16 to 19 fathoms. It is said that the presence of the bank is indicated in ordinary weather by strong rippings. The mark to lead over it in 9 fathoms is Romney church, open a little eastward of Dungeness lighthouse, N.  $\frac{1}{2}$  E.

Between the Bullock bank and Dungeness the depth is 16 to 19, 20, and 15 fathoms, the latter being close under the land; and between it and the south-west end of the Ridge or Colbart, and Les Ridens, generally 11 to 14 fathoms.

**RIDENS.**—These are a series of patches of 6 to 10 fathoms on a bottom of sandstone and gravel, lying about  $3\frac{1}{2}$  miles S. by W. from the south end of the Ridge, at the distance of 16 miles S.S.E.  $\frac{1}{2}$  E. from Dungeness, and 12 miles W.N.W. from the Napoleon column at Boulogne. Usually their position is indicated by strong rippings, especially if the tide is running with strength; a heavy sea also breaks upon them in bad weather. Close to them all round, the depth is 13 fathoms, and between them and the coast of France, 25, 28, and 14 fathoms, the latter being at about 3 miles from cape Alprech.

The mark for the centre of the Ridens is Lydd church and Dungeness lighthouse nearly in one N.N.W.  $\frac{1}{2}$  W. and the lighthouse on cape Alprech S.E.  $\frac{3}{4}$  E.

\* These trees are very conspicuous, being close and compact, and appearing the same from whatever direction viewed at sea.

If Cape Blancenez be brought well open of Cape Grisnez it will lead northward of the shoals; and, if shut in with that cape, southward of them.

**BASSURELLE.**—This bank lies about 6 miles southward of the Bullock bank, 18 miles W.  $\frac{3}{4}$  N. (nearly) from cape Alprech, and the same distance S.  $\frac{3}{4}$  W. from Dungeness. It is estimated to be about 6 miles long in an E.N.E. and W.N.W. direction, and to have a breadth of about 2 miles; but these limits are uncertain, as we believe it has been only partially examined. The depth on it is 8 to 10 fathoms; but there are some shoal spots, on one of which, when examined in 1835 by the French surveyors, only 22 feet water at low spring tides were found. Close to it the depth is 15 to 20 fathoms, and between it and the northern part of the Vergoyer as much as 24 fathoms.

The Bassurelle, on account of its shoal spots and very steep edge, must be considered dangerous to large vessels. Its presence is generally indicated by strong ripplings, and, in bad weather, during a weather-tide, the sea breaks violently upon the shoal patches. To clear it on the south side, bring the semaphore on mount Lambert just open southward of the guardhouse on cape Alprech, E.  $\frac{1}{4}$  S.; and on the *west* side, Romney church open westward of Dungeness lighthouse, N. by E.

**VERGOYER.**—This bank has an extent of about 14 miles N.E. by E.  $\frac{1}{2}$  E. and S.W. by W.  $\frac{1}{2}$  W. and lies therefore nearly parallel to the Bassure de Baas, from which it is distant about 5 miles. Its distance from the French coast is 10 to 14 miles, and in its broadest part it is not more than a mile wide. The depth over it is 5 to 7 fathoms, with the exception that at its northern end there is a dangerous spot of only 12 feet, within a short distance east and west of which is a depth of 13 to 20 fathoms. Upon this shoal spot the sea breaks heavily when the wind is high, and especially if it blows in a direction opposed to the current; it is, therefore, at these times that its position can be most readily perceived. From this dangerous patch the land (from the hills over Etaples as far as cape Grisnez) can be distinctly seen in clear weather, but the sky must be very clear for the observer to distinguish so distant an object as cape Grisnez.

The marks for the 12-foot patch are, cape Grisnez lighthouse N.E.  $\frac{3}{4}$  E. (easterly)  $19\frac{1}{2}$  miles; mount Couple, E.N.E.  $\frac{1}{2}$  N., 22 miles; the lighthouse on cape Alprech E. by N.,  $11\frac{1}{2}$  miles;\* and mount St. Frieux E. by S.  $\frac{1}{2}$  S., 11 miles. To clear it, on the *north-east* side bring Lydd church in sight southward of Dungeness lighthouse, N.N.W.; and on the *north* side, mount Lambert midway between Outreau church and the guardhouse on cape Alprech, E.  $\frac{1}{4}$  S.

The depth on the Vergoyer increases gradually as its southern extremity is approached. When bound to Boulogne from southward, and running between the Bassure de Baas and the Vergoyer, it is necessary to pay great attention to the lead, that a less depth than 15 or 16 fathoms be not obtained;—the state of the tide should also be considered.

**BASSURE DE BAAS.**—The southern extremity of this bank, on the parallel of the mouth of the Authie, has been only partially surveyed. In lat.  $50^{\circ} 34'$  it is distant from the coast about 4 miles, and thence extends along the land towards cape Grisnez, gradually approaching it as it proceeds northward, until at its northern extremity, nearly opposite Ambleteuse,  $3\frac{1}{2}$  miles from the cape, it is not more than  $1\frac{1}{2}$  miles from the shore. The average depth on the bank is  $3\frac{1}{4}$  to 4 fathoms, but south of lat.  $50^{\circ} 29'$  it increases to 6 and 7 fathoms, and apparently continues to increase towards its southern end, where probably it is not less than

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\* The lighthouse can be seen at this distance only in very clear weather.



10 fathoms. The east and west sides of the bank are steep, rising from 11 and 13 fathoms, and outside it the depth rapidly increases to 23 and 24 fathoms. We believe that upon the greatest part of it there is a strong rippling when the wind blows with any strength, and especially if in a direction opposed to the current.

When examined in 1835 the most dangerous part was found to be a knoll of 12 feet water, half a mile in extent, near the northern end of the bank in the vicinity of cape Alprech. The marks for this knoll are fort Heurt, N.E. by E.  $\frac{1}{2}$  E. (easterly); cape Alprech lighthouse, E. by N.  $\frac{1}{4}$  N., Gravois mill, E. by S.; and the summit of mount St. Frieux, S. by E.  $\frac{3}{4}$  E. Upon it the sea broke with violence when blowing strongly from North-westward to South. When approaching Boulogne from southward this knoll may be cleared on its east side by keeping point La Crèche in one with fort Heurt.

The northern portion of the Bassure de Baas (that fronting the road of Ambleteuse and Boulogne) has a depth on it at low water of probably not less than 15 to 19 feet. When running for Boulogne this part may be crossed in  $5\frac{1}{2}$  to  $6\frac{1}{4}$  fathoms by not going more to the north than fort La Crèche, bearing E. by S.  $\frac{1}{2}$  S., or more to the south than fort Heurt bearing E.  $\frac{1}{4}$  N.

#### BEACHY HEAD TO SPITHEAD.

From Beachy head to the Owers lightvessel, the course is W. by N. 36 miles; and to Dunnose on the same course nearly 56 miles. From Beachy head to Selsea Bill the course trends in a curve; but the direct bearing and distance from the one point to the other are W. by N.  $\frac{3}{4}$  N., 40 miles.

**Cuckmore Haven** is 4 miles westward of Beachy head. In this harbour there is a depth of only 6 feet at low water, and sometimes it is completely closed by the washing in of the beach in stormy weather until reopened by land-floods. Between it and Beachy head the shore is steep and the soundings along it are regular.

Six caverns, with entrances 3 feet wide and flights of steps 20 feet in height, terminating in an apartment 8 feet square, have been cut in the cliffs between Beachy head and Cuckmore haven, and the place known as Darby's cave has been repaired, so that those who may be unfortunately wrecked on this part of the coast may now find safe refuge.

**Seaford.**—Seaford roadstead fronts the coast between the tide-mill eastward of Newhaven, and the martello tower north-westward of Seaford head. With off-shore winds vessels may anchor off any part of the coast between Beachy head and Shoreham in from 2 to 9 fathoms. Seaford roadstead, however, is the place of general resort. The best position is between the tower and Blatchington battery, with Beachy head lighthouse shut in by the cliffs; here the bottom is of sand, shells, and mud, and the anchorage is sheltered from winds as far southerly as E.S.E., being one point more southward than that afforded by Dungeness West road. Seaford head may be distinguished from Beachy head by a large green patch on its face, and by having no building on the top, whereas Beachy head has a small building on its highest part.

**NEWHAVEN.**—Newhaven, about 8 miles westward of Beachy head, is a good haven for ships of moderate tonnage, the depth within the bar and up to the town being 21 to 24 feet at high water springs, and 14 to 20 feet at neaps. The bar extends across the entrance, at about 250 feet outside the piers, and consists of compact shingle or pudding-stone, with about six inches of water over it at low tide. It is high water at

Newhaven (full and change) at 11h. 51m., springs rise 20, and neaps 15 feet; neaps range  $10\frac{1}{4}$  feet.

On the western pier is a flagstaff upon which, in the daytime, is hoisted one black ball, while the depth on the bar is 8 to 10 feet water, and two black balls while 10 to 13 feet; while there are 13 feet and upwards a red flag only is hoisted.

Newhaven, by its recent improvements, was considered by Mr. Tasker, the harbour-master, to be the best tide harbour on the coast between Harwich and the Isle of Wight. It is situated between the shore of Seaford on the east, and the Burrow cliff on the west. Seaford cliff, in running in, shows white with a green patch in the middle, and the Burrow cliff appears a reddish copper colour over the white chalk; these cliffs respectively appear at the end of each cheek of the bay, by which the track in may be readily known.

About half a mile eastward of the piers are the tide-mills, built of yellow brick, and appearing high over the beach when coming in. The piers are 120 feet distant from each other; between them at high water in good neap tides the depth is 14 feet, and with spring tides 20 to 24 feet. The beach is at all times shifting about the mouth of the harbour, so that no mass remains long together. Extending from the western side of the east pier is a sort of low dicker-work about 3 feet high; when vessels can run over the shifting poles or spits outside, they can go over this dicker-work, but it is recommended always to keep in mid-channel in the harbour, by which the said work will be avoided.

The bay is one of the finest roadsteads in the Channel with the wind from N.N.W. to E. by S. The soundings are generally very regular. If a vessel, in running for the harbour, through rough weather, chance to get at the back of the east pier, she is not likely to receive any material injury; vessels thus situated have been frequently got off in the next tide without any injury whatever; but for many years few accidents have occurred.

Pilots are at all times stationed at the piers to conduct vessels into the harbour; every assistance is rendered by means of capstans, ropes, &c., free of expense; and as a guide to the harbour, when vessels can enter, signals are exhibited. The poles or spits at the entrance seldom extend further off than from 100 to 300 feet. There is also a gridiron capable of taking up vessels of 600 tons burthen, and 200 feet long. A lifeboat is stationed here.

It has been further observed by Mr. Tasker, that Newhaven can with confidence be recommended as a place of shelter to those who are overtaken with adverse winds. Vessels of 300 or 350 tons have frequently moored there in safety.

**Lights.**—Two *fixed* lights are shown from the western pier at the respective heights of 17 and 28 feet above the sea: they bear from each other N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E., and when in one point out the fairway to the entrance. The high light is shown all night; the low light shows *red* when the depth on the bar is 10 to 13 feet, and *white* when above 13 feet.

In order further to assist vessels when entering between the piers, a wooden tower (painted stone colour) on the eastern pier, directly opposite the low light, shows a small *green* light at 18 feet above high water, visible about 3 miles.

**Directions.**—Vessels bound from eastward for Newhaven should run towards Burrow head on the western side of the harbour, and bring the piers to bear North with the entrance open; then steer directly in (if there is sufficient water), passing westward of the red buoy outside. The course when within the bar is about N.  $\frac{1}{2}$  E. up the harbour. At night bring the lights in one, and when up to the entrance proceed as before. When far enough in anchor, or row a warp to the berthing piles or stage, and drop into a berth.



About  $1\frac{1}{2}$  hours before high water the stream begins to set westward close along the shore, but across the mouth of the harbour it is so weak as to be of no importance to any but a sailing vessel with a light wind. Between the piers the stream runs with great velocity on both ebb and flood, decreasing in force as the harbour widens. On the strength of the ebb the harbour is by no means easy of access, and formerly signals were not shown during the ebb, but it is now considered necessary to have them for the use of the steamers.

**The Coast.**—The coast between Newhaven and Brighton is studded with rocks:—the principal patches are the *Frickers*, just westward of Newhaven, and detached from the low water mark off Burrow head, and the *Black Rock Ledge*, a little eastward of Brighton pier. These are not dangerous, as the soundings shoal regularly towards the shore, and consequently the lead is a sufficient guide: a good working mark, however, is Beachy head light kept a point open of Seaford cliff, as it will lead clear of all the rocks off this part of the coast.

**BRIGHTON.**—The centre of this fashionable watering-place is about 8 miles westward of Newhaven. The houses fronting the sea present an almost continuous line of handsome buildings for a distance of 3 miles; and though no manufactures are carried on, the prosperity of the town may be estimated from the fact that in half a century the population has been quadrupled. In 1861 the population amounted to 87,317.

**Lights.**—A magnificent pier, lately constructed, extends 1115 feet into the sea, and at its head (which is 140 feet broad) is displayed a *fixed red* light, visible in clear weather at the distance of 5 miles. A mile eastward of this pier is the Old Chain pier, which extends 1100 feet from high water mark; at its outer end, from an elevation of 35 feet, is exhibited a *fixed green* light, visible 10 miles.

**Jenny Ground Rocks.**—This dangerous ledge, nearly  $2\frac{1}{2}$  miles westward of Brighton, extends about three-quarters of a mile from shore, and has only 4 to 6 feet over it at low tide; it will consequently bring up vessels of 10 feet draught at the last quarter ebb. It may be avoided by keeping Lancing mill open southward of Shoreham church; during night vessels should keep outside the depth of 5 fathoms, until the high light at Shoreham bears N.N.W. Shoreham church is about a mile westward of the pier; it has a square tower, and its roof appears white, rendering it conspicuous at some distance. Approaching from westward, after passing Worthing point, it will appear on the east side of a deep valley.

**SHOREHAM.**—The entrance to this harbour lies N.W.  $\frac{1}{2}$  W.,  $18\frac{1}{2}$  miles from Beachy head light, and E. by N. (northerly)  $19\frac{1}{2}$  miles from the Owers lightvessel. At high springs the depth within the harbour is about 18 feet; at neaps 15 feet. At the custom-house the depth is about  $11\frac{1}{2}$  feet with high spring tides. The bed of the river between the wharves and the town is uneven and hard; at the town the bed is 5 feet above the level of low springs at the piers.

Shoreham harbour is formed by the outset of the river Adur, which flows through the beach between two piers, 176 feet apart. Within these a third or middle pier, built out from the shore, divides the harbour into two parts, of which the western arm is the natural one formed by the course of the river, while the eastern is partly artificial and partly formed by the original course of the river. A patent slip is in each arm; that in the western arm is capable of receiving a vessel of 600 to 700 tons burthen; the other, in the eastern arm, of about 300 tons.

The western arm is  $20\frac{1}{2}$  feet deep at high water springs, and 15 feet at high water neaps, and vessels drawing not more than 7 feet can lie afloat at low water springs.

The eastern arm, between the middle pier and the entrance lock of the floating canal, is  $17\frac{1}{2}$  feet deep at high water springs, and 12 feet at neaps. The canal is  $1\frac{1}{2}$  miles long, and has 16 feet water in it at high water springs, and 11 feet at neaps. The lock is 175 feet long, 33 feet wide, and the sills have  $21\frac{1}{2}$  feet over them at high and 5 feet at low water springs; and 16 feet at high and 8 feet at low water neaps. Vessels drawing 15 feet can lie afloat inside the lock.

The horn or breakwater near the west side of the western pier, must not be mistaken for the western pier-head by vessels entering.

**Lights.**—Within and opposite the entrance are two lighthouses, which, brought into one, N.N.E., lead between the piers. The low light is on the centre pier, and exhibited only while the depth between the piers is 11 feet, or when it is deemed prudent for a vessel to run for the harbour: at high water and slack tide, it is coloured *red*. The high light, in an elegant Portland stone tower at the back of the harbour, is shown at 42 feet above the sea, and is visible about 10 miles. The two buildings are distant from each other 750 feet, and both lights are *fixed*.

**Tides and Tidal Signals.**—It is high water (full and change) in New Shoreham harbour at 11h. 34m.; springs rise 18 feet, and neaps  $13\frac{1}{2}$  feet. The stream on both tides runs with great force between the piers, often as much as 6 knots; on the flood it is split by the middle pier, and its force diminished in each arm.

Near the low lighthouse is a flagstaff, upon which during day a red flag is hoisted while there are 11 feet water and upwards in the harbour; at high water slack, it is hauled half staff down. From the same flagstaff the following tidal signals are made:—

SIGNALS.	SIGNIFICATION.
A single ball at masthead . . .	General answer or acknowledgment.
Two balls    "    " . . .	There are 8 feet water on bar with flowing tide.
Three balls   "   " . . .	" 9   "   "   "
One ball at outer yard arm . . .	" 10   "   "   "
Two balls   "   " . . .	" 11   "   "   "
Three balls   "   " . . .	" 12   "   "   "
One ball at inner yard arm . . .	" 13   "   "   "
Two balls   "   " . . .	" 14   "   "   "
Three balls   "   " . . .	" 15   "   "   "
A single ball at each yard arm . . .	" 16   "   "   "
A pendant at masthead . . .	It is now slack tide.
"    and one ball under at mast-head.	" 16 feet on bar with an ebbing tide.
"    and two balls under at mast-head.	" 15   "   "   "
"    at masthead, and one ball at outer yard arm.	" 14   "   "   "
"    and two balls at ditto . . .	" 13   "   "   "
"    and three balls at ditto . . .	" 12   "   "   "
"    and one ball at inner yard arm.	" 11   "   "   "
"    and two balls at inner yard arm.	" 10   "   "   "
"    and three balls at ditto . . .	" 9   "   "   "
"    at outer yard arm . . .	" 8   "   "   "



SIGNALS.	SIGNIFICATION.
A pendant and one ball under at inner yard arm.	There is not water enough on bar.
„ and two balls under at ditto .	Keep eastward.
„ between two balls at ditto .	Keep westward.
„ under one ball at ditto .	The signal cannot be made out, the flag is foul or hid by upper sails.
„ under two balls at ditto .	The depth of water will be shown at every foot rise or fall.
„ at inner yard arm . . .	Assistance will be sent immediately.
„ with one ball under at ditto .	Pilots cannot get to sea.
„ with two balls under at do. .	Pilots will be sent when a boat can pass the bar.
One ball with pendant under at inner yard arm.	Pilots are all engaged, but one will be sent as soon as possible.
Two balls ditto ditto .	The owner wishes his vessel to bear up for shelter.
„ at outer and one ball at inner yard arm.	The owner does not wish his vessel to risk the bar.
One ball at outer, and two balls at inner yard arm.	Pilots will be on the pier, if the vessel attempts the bar the depth of water will be shown.
Two balls at masthead, and one ball at outer yard arm.	It appears a vessel might stem the tide.
Ditto ditto inner yard arm . .	The tide runs so strong that a vessel may not be able to stem the tide.
One ball at masthead, with pendant under.	The tide is ebbing.
Two balls ditto ditto . . .	The tide is flowing.

**Directions.**—Vessels from westward should be cautious to avoid the Grass bank, eastward of Worthing, which is a low flat ground extending considerably off shore and having over it as far out as  $1\frac{1}{2}$  miles only 9 feet water: it may be easily avoided by the lead. When near Shoreham, there is danger of touching the *Church* and *Dutch* rocks, two clusters about  $1\frac{1}{2}$  miles westward of the piers. The highest of the Church rocks shows at low spring ebbs, and is about a quarter of a mile from low water mark. The Dutch rocks lie about a cable W.N.W. from the Church rocks, and between them the depth is 6 to 7 feet at low water.

There is anchorage off Shoreham at one-third of a mile, or one mile from shore, in 16 or 24 feet water, bottom of sand and gravel with patches of chalk; or westward of the Jenny Ground rocks, in 3 fathoms, sand, shells, and mud, with Shoreham church and Lancing grove in line. If obliged to wait for sufficient water to enter the harbour, anchor in  $3\frac{1}{2}$  fathoms off the black Coast-guard buildings, with Shoreham church North, and Portslade mill between the low lighthouse and the pier-heads; this anchorage is sheltered from westerly winds by the flats running off from Worthing, and has the advantage of an easy stream during the flood. It is to be observed that the ebb tide sets strongly westward, in-shore, nearly two hours before it is high water at the pier-head; so that ships with westerly winds may avail themselves of it to get to westward, by making short tacks near the shore. The flood near the shore makes to eastward before low water.

When entering the harbour keep the entrance open with the two lights in one, and having passed within the piers, steer along either pier, according to the branch of the harbour bound to, to avoid running foul of the middle pier, on which the tide sets strongly. In the western arm, abreast the wharves, some buoys are moored on the edge of a steep bank; it is usual to run a warp to these buoys, or run the vessels fore-foot on the bank, or drop the anchor and let the flood stream swing her stern round, and then warp into a berth.

In blowing weather (by night), when pilots cannot get off, vessels should keep their light hoisted until they get into the harbour, and a pilot on board.

**The Coast.**—Between Shoreham and Littlehampton are the Church rocks, Grass bank, and Kingmere rocks, of which the two former have been alluded to in the preceding directions. The Kingmere rocks have from 27 to 30 feet water over them, and their eastern end lies S.S.W. from Highdown hill (on the face of which are three chalk pits and a black mill on its western slope), at about  $4\frac{1}{2}$  miles from the shore; from this they extend 2 miles in a N.W. by W. direction and are very narrow. Between them and the flat extending from the shore is a depth of  $5\frac{1}{2}$  and 6 fathoms, and immediately off their southern side 6 to 8 fathoms.

**LITTLEHAMPTON and ARUNDEL.**—The entrance to the harbour is about N.E.  $\frac{1}{3}$  E.  $10\frac{1}{2}$  miles from the Owers lightvessel, and N.W.  $\frac{1}{4}$  W. 28 miles from Beachy head. In the harbour the depth in the fairway off the warping post is 16 feet, abreast the bush beacon on the low dicker-work extending from the western pier 15 feet, between the piers 17 feet, abreast the mill 16 feet, and up to the north-western part of Littlehampton 18 to 16 feet. Vessels of 13 or 14 feet draught can reach Arundel. The average depth over the bar is  $14\frac{1}{2}$  to  $15\frac{1}{4}$  feet at springs, and  $9\frac{1}{2}$  to 11 feet at neaps.

Littlehampton is about three-quarters of a mile within the entrance of the Arun, and was the ancient haven of Arundel. On the western shore, there is a ship-yard and a patent slip; the latter being 400 feet long, and capable of receiving a ship of 400 tons burthen, and of 10 feet draught.

**Lights.**—A *fixed red* light, shown all night on the north end of the east pier at the entrance of the Arun, is 30 feet above high water, and visible in clear weather about 7 miles.

The following lights on the south end of the east pier shew the depth of water, and when in one with the above red light, bearing North, lead to the entrance. A *white* light indicates 10 feet between the piers; a *green* light, 11 feet; a *red* light, 12 feet; a *red* and *white* light, perpendicular, 13 feet; two *white* lights, perpendicular, 14 feet; and a *white* and *green* light, perpendicular, 15 feet. These lights are extinguished at high water.

**Tides.**—At Littlehampton it is high water (full and change) at 11h. 36m.; springs rise 16 feet, and neaps  $11\frac{1}{2}$  feet. The general depth over the bar is  $14\frac{1}{2}$  to  $15\frac{1}{4}$  feet at high water springs, and  $9\frac{1}{2}$  to 11 feet at neaps. At Arundel it is high water at 12h. 25m.

The tidal signals are made from a signal-staff near the lighthouse. They are exactly similar to those used at New Shoreham, and give the depth in feet at the entrance.

**Directions.**—Approach the entrance with the outer warping post in one with the lighthouse, bearing North. If obliged to anchor outside the harbour, it is advisable, with the wind easterly, to do so off Rustington mills (eastward of the harbour), as the stream will set westward by the time there is water to enter. There is good anchorage for a vessel of 10 feet draught in a 2-fathom hole, with the outer warping post in one with the mill near the harbour, N.  $\frac{3}{4}$  E., or a mile

southward of the entrance in 13 feet over chalk and gravel. A vessel of 17 feet draught can anchor with the harbour open at  $1\frac{1}{2}$  miles from the entrance, in 19 or 20 feet water, bottom of chalk, stones, and gravel. Another anchorage recommended by the pilots is with Littlehampton church in line with the coast-guard houses eastward of the harbour mill, and the black buoy marking Winter knoll, W. by N., about a mile.

When the weather does not permit pilots to go out, it is usual for one to attend on the east pier to signal the vessel in, and for another to be in a boat between the piers to board her as soon as she gets within the breakers. The flood runs into the harbour with great velocity until one hour after high water; but immediately outside the eastern pier-head, from half-flood to half-ebb, it sets strongly westward, which must be carefully attended to when entering or leaving, to avoid the western jetty work. The stream in the river, however, depends upon the state of the country, for after heavy rains there is a constant downward current.

**Rocks, &c.**—Immediately fronting the coast between Littlehampton and Pagham are Winter Knoll, the Shelly rocks, Middleton ledge, the Bognor, and the Barn rocks. From the last-mentioned rocks to Selsea Bill the coast is low and fronted by a flat whose outer edge, 3 fathoms, is at least 2 miles from it.

*Winter Knoll.*—This is a small chalk bank of 8 feet water lying  $1\frac{3}{4}$  miles off Elmer coastguard station, and S.W. by W.  $2\frac{1}{2}$  miles from Littlehampton lighthouse; off its southern side is moored a black buoy, in 17 feet water.

*Shelly rocks* are  $1\frac{1}{2}$  miles westward of Winter Knoll, and S.S.E.  $1\frac{3}{4}$  miles from Felpham mills; they have from 4 to 6 feet water upon them, and are marked on their south-eastern side by a black buoy in 3 fathoms.

*Middleton ledge* runs off from the shore between Middleton and Felpham mills, and consists of a straggling ledge of rocks projecting a little beyond the low water mark in a S.S.E. direction towards the Shelly rocks. The depth on its outer extremity is 4 to 6 feet, and between it and the Shellys is a narrow passage of 11 feet water; but no vessel drawing more than 9 feet should navigate at low water in-shore of either the Shellys or the Winter Knoll.

*Bognor rocks* run off from the shore a little westward of the town of Bognor, and extend in a south-easterly direction for at least  $1\frac{3}{4}$  miles; they are dry some time before low water, and are bold-to on their sea face. The eastern extremity of these rocks, Bognor spit, lies nearly a mile off shore with Felpham church open eastward of the two mills.

*Barn rocks.*—These are about one mile westward of the Bognors, and uncover at low water, but as they do not extend very far from the shore, are only dangerous to boats.

**Pagham Harbour** is so completely choked by ever-shifting sandbanks, that as a harbour it is utterly useless. Selsea church stands on the western side of the entrance, and Pagham church on the eastern; both are useful sea-marks, but the latter having the taller spire is the more conspicuous.

**PAGHAM BAY, or THE PARK.**—Pagham bay is formed by the flats and the rocks just described, and the Owers shoals. The anchorage in this bay, known to seamen as 'the Park,' is approached generally eastward of the Owers; although there are several passages among those shoals suitable for small vessels. Here shelter may be had from the violence of West and S.W. winds; but not when the wind is anything eastward of South, at which time the anchorage is very dangerous. The ground holds well, the bottom being stiff clay under a thin layer of gravel; but the anchorage cannot be recommended as a refuge to large vessels, owing



to the great rapidity with which the sea gets up under the frequent and sudden shifts of wind.\*

Small vessels bring up with Mixon beacon (southward of Selsea Bill) W.S.W., and Chichester spire in line with Pagham watch-house, in about 3 fathoms at low water: large vessels anchor further out, both for greater depth of water and increased facility for getting away in the event of a change of wind. The nearer the Mixon beacon is approached, the stronger the tide.

Coasting vessels unable to reach the Park with strong westerly winds, occasionally anchor in-shore of the Bognor rocks, although this anchorage is not recommended, because with S.E. winds there is no outlet, and these send in a heavy sea. Felpham mills N.  $\frac{3}{4}$  W. lead between Bognor spit and Shelly rocks; having rounded the spit, stand in westward and anchor where most convenient.

**Tides.**—On the shore near Pagham harbour it is high water at 11 $\frac{1}{2}$  h. (full and change); springs rise 16 and neaps 8 $\frac{1}{2}$  feet. In the Park the eastern stream makes at 4 h. 5 m., and sets East, and the western stream at 9 h. 50 m., and sets for the first 3 hours about West; between the third and fourth hour it slackens and runs from W.S.W. to S.W. by S., gradually trending southward until the eastern stream makes; the strength never exceeds 1 $\frac{1}{2}$  knots.

**OWERS.**—Selsea Bill, a low pointed projection, has southward from it numerous shoals, known under the general denomination of the "Owers;" but which bear the various names of Streets, Grounds, or Malt Owers, Dries, Mixon, Brake or Cross ledge, Boulder, Pullar, Middle Owers, Outer Owers, Eastborough bank, East bank, &c. These shoals extend 3 miles to the S.S.W. from the point, and thence to the S.E.  $\frac{1}{2}$  E., nearly 5 miles; they are extremely dangerous, and require care to avoid, particularly as the depth is 7 to 10 fathoms, or even more, at a short distance from their outer edge. Their form also is so very irregular, that an accurate idea of their configuration can only be obtained by an inspection of the chart. Between the shoals and the shore is a channel known as the Looe, in which is a depth of 3 $\frac{1}{2}$  to 5 fathoms, and in some places less;—small vessels, under the guidance of local knowledge, sometimes pass through this passage, although the navigation is intricate. There is also another channel named the Swatchway.

**Streets, Grounds, Dries, Mixon, &c.**—These rocks surround Selsea Bill and extend from shore about 1 $\frac{1}{4}$  miles. The first three are continuous and lie westward of the meridian of the Bill; the Mixon (the western end of which is named Bullaker), on the contrary, just eastward of it;—between them are 14 to 10 feet water, gradually shoaling to the shore. The Streets, Grounds, and Dries are awash at low springs, and their southern (the Dries) end is marked by a conical black buoy in 7 feet water. The Mixon covers at a quarter flood, and is connected to the shore by a gravelly bank, dry at low water springs; upon it is a beacon surmounted by a triangular framework, 30 feet above high water.

**Brake or Cross Ledge.**—This is a reef of uneven rocks running from the Dries south-westward, and forming a bar to the western entrance of the Looe. Over it the depth is 9 to 21 feet at low water.

**Boulder and Middle Owers.**—These form the southern boundary of the Looe, and may be considered as one bank. This dangerous reef commences at the south-west end of the Cross ledge, and continues from the Pullar buoy (*black* and

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\* Authorities differ in reference to the value of the Park as a place of anchorage. Captain Martin White, R.N., considered it very indifferent, and to be by no means resorted to, unless in emergency, or while there was no prospect of gaining an offing, or of reaching Spithead or the Downs.

*white* vertical stripes with staff and cage, which marks the southern side of the western entrance to the Loos about 1 mile in a S.S.W. direction, and then bends round to the S.E. by E. for  $3\frac{1}{4}$  miles to the limits of the main Swatchway. At its south-west corner it is guarded by the Boulder buoy (*black*) which is moored in 9 fathoms.

The Boulder, the western part of the bank, consists of gravel and large stones, and is very dangerous, having only one foot of water on its shoalest part, and its outer edge being steep. Eastward of this the bank consists of gravel and rock 6 to 15 feet under water; there are, however, two narrow channels  $3\frac{1}{2}$  to 4 fathoms deep, which may be distinguished when the tide is running by the ripple over the adjacent shoals; to pass through the *western* channel bring Mixon beacon in one with the first clump of trees eastward of Pagham church, and the same beacon in line with Chichester spire leads through the eastern channel. The Middle Owers, the eastern part of this bank, has upon it a *rocky* head nearly dry at low water, with the exception of which the depth of it is 9 to 18 feet; this rocky head is guarded on its north-east side by a *black* and *white* chequered buoy in 5 fathoms.

The western side of the reef just mentioned should not be approached nearer than when the west end of Medmery barn appears in one with Chichester spire. This mark just clears the Boulder, but should not be followed to the northward, because it leads across the Streets.

**Swatchway.**—About half a mile eastward from the highest part of the Middle Owers the shoal breaks down into 5 and 6 fathoms. This depth continues for nearly half a mile, when the ground again rises, and forms the West head, a reef of 13 feet under water; the channel between these shoals is known as the Swatchway. Large vessels from eastward encounter the shoal flats in the Park, before they arrive at it, as will also those from westward, immediately they have passed through it; upon these flats the depth is as little as 15 feet, consequently the rise of tide should be watched.

To pass through the Swatchway from *eastward*, bring Mixon beacon in one with Street coast-guard houses, N. by W.  $\frac{3}{4}$  W.; and from *westward*, Kinnaird house over the Clarence hotel (at the eastern end of Bognor) N.E.  $\frac{1}{4}$  N.; this mark leads eastward of the Middle Owers, and to the anchorage in the Park.

**West Head.**—This shoal forms the eastern boundary of the Swatchway. It lies E.S.E.  $\frac{1}{4}$  E., nearly a mile from the buoy of the Middle Owers, and S.S.E.  $\frac{1}{8}$  E.  $2\frac{3}{4}$  miles from Mixon beacon; on it the depth is  $2\frac{1}{2}$  fathoms water, rocky bottom.

**Outer Owers.**—On account of the shallow water upon it, the strength of the tide, and the tremendous sea in southerly gales, the Outer Owers is one of the most dangerous shoals in the English Channel. It is on the eastern side of the approach to the Swatchway, and being of very irregular shape, its limits are difficult to define, but it occupies an extent of 2 miles N. by E., and S. by W., and the same distance east and west. The depth over it is 9 to 15 feet, and in one part near its centre only two feet: this shoal spot, known as the Shoal of the Lead, is distant  $4\frac{1}{2}$  miles about S.E. by S.  $\frac{1}{4}$  S. from Mixon beacon. The southern prong of the Outer Owers is named the Elbow; great caution must be observed in approaching it, as it is steep, and a depth of 30 fathoms will be found within 100 yards of its extremity.

**Lightvessel.**—The Owers lightvessel lies in 19 fathoms, at half a mile S.S.E. from the Elbow of the Owers; Mixon beacon N.N.W.  $\frac{1}{4}$  W.; and the Nab lightvessel N.W.  $\frac{3}{4}$  W., distant 13 miles. It shows a *revolving* light, showing *white* and *red* flashes at intervals of half a minute, in the order of *two white* and *one red*; it is 38 feet above the sea, visible 10 miles. During foggy weather

a powerful trumpet is sounded,—*six* blasts every minute; and a gun is fired when vessels are observed standing into danger; immediately after which the ball at the mast-head is lowered half-mast, and retained in that position until the vessel in danger has altered her course.

Vessels going down Channel should be careful to keep southward of this light-vessel, and when westward of it, and bound into Spithead, must be careful not to steer more northerly than W.N.W., to avoid getting upon the Boulder bank. When ascending the Channel, there is no difficulty in observing these directions in a contrary order.

Vessels going down Channel, and obliged by contrary winds to bear up for anchorage in the Park, should pass eastward of the lightvessel at a convenient distance, and not bring it to bear more southerly than S.W.  $\frac{1}{2}$  S., until distant  $3\frac{3}{4}$  miles from it on that bearing, when, and not till then, they may haul up more westerly for the anchorage. The lead should be kept going.

**Eastborough Head**, a bank of rocks at the inner edge of the Outer Owers, is 6 to 9 feet under water. Between it and the Shoal of the Lead there is no safe passage.

**East Bank**, about a mile eastward of the shoalest spot of Eastborough head, has over it a depth of  $3\frac{1}{4}$  fathoms. There is a passage between it and the northern point of the Outer Owers and Eastborough head, 5 to 6 fathoms deep; but large vessels should pass at least a quarter of a mile eastward of the chequered black and white buoy (with staff and cage) which is moored in 21 feet water at a short distance eastward of its shoalest spot.

The East bank, Eastborough head, and the West head, form the southern side of Pagham bay.

**Hooe Bank**.—Outside the Owers there is an extensive field of rock, 8 and 9 fathoms under water, a cast upon which gives excellent warning of the near vicinity of these dangerous shoals. Abreast of and to the S.S.W. of the Boulder, it extends outward about 3 miles, the depth inside it being 12 to 17 fathoms; thence it narrows considerably towards the Elbow (the Outer Owers), where it takes the name of Hooe bank, and is there not more than three-quarters of a mile broad. This part, however, is partially separated from the main body by a narrow swatch of rather deeper water. Its eastern edge is about a mile eastward of the meridian of the Elbow; and its outer edge, or southern side, is distant from the Elbow nearly  $1\frac{1}{2}$  miles. Between its inner edge and the Elbow the depth ranges from 13 to 30 fathoms. The Hooe very clearly shows itself by the overfall of the tide, which occasions a heavy broken sea when running to windward in blowing weather.

When in the vicinity of the Owers, the lead should invariably be kept going, and great attention paid to the soundings; certain intimation will then be given when the rocky banks southward of the Owers just described are crossed, and the first deep cast (by which is understood over  $9\frac{1}{2}$  or 10 fathoms) afterward, in standing in, must be the seaman's warning of his approach to them. Attention should also be paid to the important fact, particularly in thick weather, that, failing to obtain a deep water cast, the seaman may be tolerably certain that his vessel is westward of the Boulder bank; and, therefore, great caution is requisite not to get embayed by standing in too far. At night, in large vessels particularly, it will be prudent not to stand into less than 10 fathoms, which will insure being southward of these rocky banks. If near the western end of the Boulder bank, and steering for the Nab, a vessel will have the western tide about two points abaft the beam; and, as it runs strongly, particularly at springs, some allowance must be made, especially with a scant wind.



**THE LOOE.**—The Looe, lying as it does within the whole of these dangers, being also barred at its western entrance by turbulent overfalls, and having in many parts a depth of not more than 15 feet at low water, can only be used safely by small vessels, or by those locally acquainted, except under very favourable circumstances.

The approach from westward is over the Brake or Cross ledge, a ledge of 10 to 18 feet, connecting the Boulder bank with the Dries and Malt Owers.

*Approaching the Looe from eastward*, the course, after making the beacon buoy on East bank, is W.N.W., and it is necessary to be careful to pass eastward and northward of the buoy. It should be remembered that on Eastborough head about a mile westward of the beacon buoy, the depth is not more than 6 to 9 feet.

*Approaching the Looe from westward*, be careful not to get too close in-shore; and as the Cross ledge is approached, the Mixon beacon should not be brought northward of the Dries buoy, or Nelson monument must be well open of Hayling trees; by neglecting some such precaution as this, a stranger is likely to get entangled with the Streets, and as the eastern stream sets strongly towards the Boulder bank, some caution is necessary in light winds.

When crossing the ledge, give the Dries buoy a good berth (for there are only 11 feet water a quarter of a mile south of it)—the nearer the Pullar buoy the better, but always pass northward of the latter. If the Isle of Wight is well seen, an excellent mark for leading over the Cross ledge and the whole way through the Looe in 14 feet water is, Little See-me-not just showing southward of Culver cliff, bearing W. by N.  $\frac{1}{2}$  N. The Pullar buoy on with Culver cliff is a good mark for leading through the Looe. When Mixon beacon bears North or N. by W., the vessel may be considered as through the channel, and at the entrance of that part of Pagham bay known as the Park.

When sailing westward from the Park, in turning about, do not bring Mixon beacon southward of West, and pass it at a good distance, on account of the steepness of the rocks, and the strong eddies; take care also not to stand so far over as to get in between the beacon and the Dries buoy, for the rocks are high and dangerous; this may be done by not bringing the buoy westward of N.W. If bound out through the Swatchway, observe the leading marks already given for it. In standing towards the southern side of the Looe, when westward of the Middle Owers buoy, and so long as Felpham white mill is open eastward of Mixon beacon, do not bring the buoy of the Middle Owers to bear anything eastward of S.E.  $\frac{1}{2}$  E., which is its bearing from the Pullar buoy. When shooting over the Cross ledge contrive to pass near the Pullar buoy, on its northern side, the depth being only 11 feet at fully one-quarter of a mile southward of the Dries buoy.

When passing through the Looe, from westward to eastward, it is easy to reverse the foregoing directions. But it should be remembered, that with flood tide and little wind, the stream sets obliquely across the direction of the leading mark and towards the Boulder, which must be particularly attended to when near the Cross ledge, for, without a commanding breeze, there will be danger of being drifted on that bank.

The Looe stream should not be attempted except with daylight, a strong breeze, and a favourable tide.

*Tides.*—It is high water at Selsea Bill at 11 $\frac{3}{4}$ h.; springs rise 16 $\frac{1}{2}$ , neaps 12 $\frac{1}{2}$  feet. Near the Pullar buoy the eastern stream, on full and change, makes at 3 $\frac{3}{4}$ h., and the western stream at 10h., and sets S.E. and N.W. Two or three miles outside the Boulder the stream turns about an hour later, the eastern stream setting E.S.E., and the western stream West, which are the same directions that they take between

the Pullar and the middle Owers. Near Eastborough head, at the eastern entrance of the Looe, the eastern stream makes at  $4\frac{1}{2}$ h., and sets E.N.E.  $\frac{1}{2}$  E., and the western stream at 9h. 50m., and sets West. Off the west end of the Hooe bank the eastern stream makes at 4h. 35m., and sets E.S.E., and the western stream at  $10\frac{1}{2}$ h., setting W.  $\frac{3}{4}$  N.

**Medmery Bank** lies westward of Selsea Bill, nearly 2 miles from the shore, and about half a mile from the Grounds, from which it is separated by a depth of 6 to 8 fathoms. It is about  $1\frac{1}{4}$  miles in extent in a N.W. by N., and S.E. by S. direction, and has a depth of  $2\frac{1}{4}$  to  $3\frac{1}{2}$  fathoms upon it, with 6 to 7 fathoms a short distance off. It should not be approached on the south side into less water than 4 fathoms, when the north-east end of the chalk-pit in Portsdown hill will appear in one with the south-west end of Hayling trees.

**Bullock Patch.**—This is a patch of  $4\frac{3}{8}$  fathoms, lying  $4\frac{3}{4}$  miles from Selsea Bill, in a direct line between it and Culver cliff. The depth close to it is 6 to 8 fathoms, and it should not be approached on its south side nearer than when Ashy Down tower is in one with the spire of Bembridge church, W. by N.  $\frac{2}{3}$  N. A *black* buoy is moored in 7 fathoms, about a quarter of a mile south-westward from it.

**Hounds.**—The Hounds is a patch of rocks which uncovers at springs, running out three-quarters of a mile from the shore between Medmery barn and Thorney coast-guard houses. Its outer edge is about 2 miles N.W. from the pitch of Selsea Bill.

**CHICHESTER.**—The entrance to Chichester harbour is about  $6\frac{1}{2}$  miles north-westward from Selsea Bill. The depth in the harbour varies from  $1\frac{1}{2}$  to 7 fathoms at low tide, but at the same time there are only 2 feet water over the bar. The time of high water on the days of full and change is  $11\frac{1}{2}$ h., and springs rise 14, and neaps about 11 feet, so that at high tide the depths over the bar range from 12 to 17 feet. Before arriving at the bar there is a shoal flat of from 8 to 15 feet least water to cross, which extends from the harbour's mouth fully 2 miles. The bar is between two gravelly banks, known as the East and West Pole sands; the former runs off from the east side of the entrance in a W.S.W. direction, and is high in some parts, and constantly undergoes alteration with each gale of wind and spring tide during the winter months; the latter, which is of no great extent, runs out nearly a quarter of a mile from Eastoke point, the west point of the entrance. Within the harbour there are channels leading to Emsworth and Chichester.

As the channels over Chichester bar are not permanent, but vary considerably in depth according to the strength of the wind and tide, strangers must always employ a pilot. If compelled to take the harbour without one, the bar should not be approached nearer than to have Haslar hospital (at Portsmouth) open of Southsea castle until there is water enough for entering. If obliged to wait for the tide, in smooth water and fine weather, an anchor may be let go;—as the ground is everywhere good, the position should be according to the direction of the wind, remembering that the only entrance is westward of East Pole sand (1865).

**Hayling Knob.** about midway between the entrances of Chichester and Langston harbours, is  $1\frac{1}{2}$  miles S.S.W. from the shore at the village of Hayling. It consists of gravel covered by 8 feet of water, and surrounded by a depth of 14 feet. The mark for passing it on the north side are Cackham tower and Berry barn in one, and on its south side Haslar hospital open of Southsea castle.

**LANGSTON HARBOUR.**—Langston harbour is  $5\frac{1}{2}$  miles N.  $\frac{1}{2}$  E. from the Nab lightvessel, and  $3\frac{1}{2}$  miles westward of Chichester harbour. At low water the depth on the bar does not exceed 9 inches, while within the harbour it is 42 to 47 feet.

It is high water on the full and change days at 11h. 36m., and the rise of tide is 13 feet with springs and 9 feet with neaps, but it is uncertain to a foot or two. The bar is between two gravel banks, extending from both points of the entrance, and known as the East and West Winners; these banks dry about a mile out, nearly block up the harbour's mouth, and frequently shift in position, hence strangers bound in must always employ a pilot.

**Buoy.**—A conical fairway buoy painted in *black* and *white* horizontal bands and marked "L.F.W." is moored in  $1\frac{3}{4}$  fathoms at low water springs, just within the bar, N.E.  $1\frac{1}{2}$  cables from the shoalest part of the bar, where the depth is only 6 feet at high water springs.

**Tides.**—The tide sets so furiously between the points and in the channel when the banks are uncovered, that it is useless to attempt to enter or leave the harbour against it. The best time for running in is about an hour before high water. It begins to set into the harbour on the days of full and change at 5h., and out at 12h., which is 24 minutes later than high and low water by the shore. In blowing weather, if any swell is up outside, there is broken water with heavy rollers over the Winners. Haslar hospital open of Southsea castle leads up to the bar between Hayling knob and Horse Tail, and, if continued, will clear the Winners in 9 feet water.

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## SPITHEAD AND ITS APPROACHES, SOUTHAMPTON WATER, AND THE SOLENT, TO POOLE BAY.

**SPITHEAD AND ITS EASTERN APPROACHES.**—The passage into Spithead from eastward is between the Dean and Horse sand, on the north-eastern side, and the Princessa, Bembridge ledge, Nab, Long rock, St. Helen patch, Warner, Noman's land, &c., on the south-western or Isle of Wight side, the whole of which are well buoyed and lighted.

**Horse and Dean Sands.**—These lie on the north-east side of the channel, and form an extensive flat that, with the exception of the Horse Tail, shoals gradually from 29 feet on its outer edge to the shore. Opposite the village of Hayling it extends out  $3\frac{1}{2}$  miles from the coast, thence runs to the N.W. and afterwards bends round and joins the shore at Southsea castle. In its western part it is very shallow, the soundings over it not being more than from 6 to 9 feet, and the edge very steep, there being 8 to 12 fathoms immediately off it. This shallow part is known as the Horse Tail; it has its edge well denoted by *black* buoys, which must always be passed on the west side when sailing into Spithead, whilst the western edge of the bank is marked by Horse fort.\* Dean Tail buoy (the outermost) carries a staff and ball.

**Princessa Shoal.**—This is the first outlying danger met with when approaching from southward; it lies on the south-west side of the channel to Spithead, its centre being about  $1\frac{1}{2}$  miles S.S.E. from Bembridge point. It is about three-quarters of a mile in extent, with general depths of 4 to  $4\frac{1}{4}$  fathoms; but there are some patches of 18 to 20 feet, which make it dangerous. It is marked by two buoys, of which that on its north-west side lies in 32 feet water, and is coloured black and white in vertical stripes;—that on its south-east side (chequered *black* and *white*, and carrying a ball) is in 29 feet water.

This shoal should not be approached nearer on its *south* side, than when the north sharp shoulder of Appuldercomb hill appears in one with Shanklin railway station W.  $\frac{1}{3}$  N.; Bembridge fort, its apparent breadth inside Nettlestone point

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\* A small *fixed* light is shown from Horse fort, at 34 feet above the sea.



N.N.W.  $\frac{3}{4}$  W. clears its *eastern* side; and its *north* side is cleared when the spire of Bembridge church is in one with Foreland farm, N.W.

From Culver cliff a ridge of  $4\frac{1}{2}$  fathoms runs off towards the Princessa shoal, on both sides of which is a depth of 5 and 6 fathoms. There are rocks at the foot of Culver cliff, and also at the base of Bembridge point, which would bring up a vessel venturing too near the shore.

**Bembridge Ledge.**—This dangerous ledge surrounds Bembridge point, and extends three-quarters of a mile from the shore. Close to its edge is a depth of 6 to 7 fathoms, and upon it are the Cole and Dawe rocks, the former of which uncovers at low water. The chalk quarry on Bembridge down in one with the Black rock watch-house and Bembridge point, bearing W.  $\frac{3}{4}$  S. just clears the Dawe rock on the south side; and St. Helen's church open  $2^{\circ}$  N. of the sea-mark near St. Helen's point, bearing N.W., clears it on the north-east side.

The extremity of Bembridge ledge is guarded by a chequered *black* and *white* buoy in 4 fathoms. If this buoy is absent, Bembridge mill on with the highest part of Brading down, W. by N.  $\frac{3}{4}$  N.; and the Dock mill at Southsea, on with the large chalk-pit on Portsdown hill, N. by E., serve as close marks for the edge of the shoal in 4 fathoms. A lifeboat is stationed at Bembridge.

**Nab Rock.**—Although the water deepens suddenly into 6 or 7 fathoms eastward of Bembridge ledge, the rocks soon rise again and extend off a considerable distance under the general name of the Nab shoal, the body of which is about a mile long N.W. and S.E., and a quarter of a mile broad, with numerous spots of 25 to 27 feet water.

The small head, known as Nab rock, near the centre of the shoal, has only 23 feet over it at low tide, and is marked on its south-east side by a can buoy (with *black* and *white* horizontal bands) in  $4\frac{3}{4}$  fathoms.

**NAB LIGHTVESSEL**, moored in  $5\frac{1}{4}$  fathoms water, exhibits two *fixed* lights 18 yards apart; the light on the mainmast is 38 feet, and that on the foremast 28 feet above the sea, and they should be visible in clear weather from the respective distances of 8 and 6 miles. From it Portsmouth church tower appears in line with Southsea castle lighthouse N. by W.  $\frac{1}{2}$  W.; Kickergill tower in line with east end of fort Monkton N.N.W.  $\frac{1}{2}$  W.; North tower of Osborne just open of easternmost trees near Ryde N.W.  $\frac{3}{4}$  W.; Warner lightvessel N.W.  $\frac{1}{2}$  N. a little over 3 miles; and Dean Tail buoy N.E.  $\frac{2}{3}$  N.  $1\frac{1}{4}$  miles.

**New Grounds, &c.**—Westward from Nab lightvessel are some patches of  $4\frac{3}{4}$  fathoms, known as the New Grounds; indeed the soundings between the bearings of N.W. by W.  $\frac{1}{2}$  W. and S.W.  $\frac{3}{4}$  S. from the lightvessel are very irregular. The mark to go northward of all is, Ryde church open of Nettlestone point, bearing N.W.  $\frac{3}{4}$  W. There is also a patch of 27 feet (the Outer Nab)  $1\frac{1}{2}$  miles S.W. from the lightvessel, close to which the depth is 5 to 6 fathoms.

As the ground in this locality is very irregular, with many patches of 5 fathoms and less, it is advisable to bear in mind when piloting large ships, that all these detached patches are comprised within the following limits—viz., The northern sharp shoulder of Appuldercomb hill in line with Shanklin railway-station, W.  $\frac{1}{3}$  N.; and the Nab lightvessel N. by E.  $\frac{1}{2}$  E.

**Long Rock.**—This is a flat of  $3\frac{3}{4}$  to  $4\frac{3}{4}$  fathoms, northward of Bembridge ledge. From it towards the shore the depth is  $2\frac{1}{2}$  to  $1\frac{1}{2}$  fathoms, and immediately outside it are 6 and 7 fathoms in St. Helen's road. The marks to avoid it are Dun-nose open of Bembridge point, and Porchester castle open eastward of Southsea castle.

**St. Helen Patch** is a little knoll of  $2\frac{3}{4}$  fathoms, lying a mile from the shore,

with Nettlestone point bearing N.W.  $\frac{1}{2}$  W.  $1\frac{1}{2}$  miles; and St. Helen sea-mark W.S.W.  $1\frac{1}{4}$  miles. It is on a small flat of  $3\frac{3}{4}$  fathoms, and between it and the shore is a depth of 15 to 8 feet, and outside it 4 to 5 and 6 fathoms. The summit of Brading down on with the sea mark, W.  $\frac{3}{4}$  S., leads southward of it.

**Warner Shoal and Lightvessel.**—Warner shoal, composed of hard sand and gravel, with shells, is 2 cables long, N.N.E. and S.S.W., half a cable broad, and has only 16 feet water over its shoalest part. It forms the south-east and No-mans-land the north-west, end of the edge of the bank off Nettlestone point, which contributes in an important degree to shelter Spithead in southerly gales. The north-eastern side of the shoal is steep-to, the water deepening from 17 feet to 11 fathoms, about 60 yards from its edge. St. Helen's patch bears from it S.W.  $\frac{1}{4}$  W. one mile, and Nettlestone point W.  $\frac{3}{4}$  N. rather more than  $1\frac{1}{2}$  miles.

The lightvessel, moored in 13 fathoms water, on the eastern side of the bank, exhibits at 38 feet above the sea a light *revolving* every *minute*, visible in all directions from a distance of 8 miles. It lies on the south-west side of the narrow channel separating the Warner from the Horse sand, and from it St. Helen's water-mill appears half its breadth open of St. Helen sea-mark, S.W. by W.  $\frac{1}{4}$  W.; the outer end of Ryde pier is seen between the towers of Osborne, N.W. by W.  $\frac{1}{4}$  W.; No-mans-land fort bears N.W.  $\frac{1}{2}$  N.  $1\frac{1}{4}$  miles; Horse fort N. by E.  $1\frac{1}{4}$  miles; Horse Elbow buoy N.E. by N. two-thirds of a mile; and Dean Tail buoy S.E. by E.  $\frac{1}{2}$  E. 3 miles.

**No-mans-land Bank, Fort, and Light.**—No-mans-land bank is of much greater extent, and more dangerous than the Warner, as it has only 7 or 8 feet water near its eastern end, with an average depth of 9 feet over every part of it at low water springs. Its eastern edge is steep-to, the lead dropping suddenly from 8 or 9 feet into 16 fathoms, and unlike the Warner there is no practicable channel between it and the island, at low water, save for the smallest description of vessels. The surface of the bank is principally gravel and shells, but so hard as to render it dangerous for vessels grounding upon it; between the bank and the island the character of the ground changes to mud and weed.

Near the eastern extremity of this bank is a fort about 70 yards in diameter, and from it at an elevation of 38 feet above high water, is exhibited a small *fixed red* light. Ships should not approach the fort within 2 cables.

**Ryde Sand.**—From Nettlestone point Ryde sand uncovers at low water springs for nearly  $1\frac{1}{2}$  miles in a northerly direction, and thence turns away W.N.W. towards the outer end of Ryde pier. A chequered *black* and *white* (can) buoy is now moored off the edge of the sand in 28 feet water.

The approach to Ryde sand should be made with caution, as its outer edge is steep-to; and although vessels may safely stand towards it into 10 fathoms water, they must on no account pass southward of the buoy. Quarr house in line with the end of Ryde pier, W.  $\frac{1}{2}$  N., just clears the northern edge of the sand.

**Sturbridge Shoal.**—This sand is midway between Ryde and fort Monkton, and is nearly three-quarters of a mile long, S.E.  $\frac{1}{2}$  E. and N.W.  $\frac{1}{2}$  W., and very narrow; the least water on it is 16 feet. It is marked by two buoys, painted with *black* and *white* horizontal stripes, the eastern of which lies in 19 feet water, and the western in 21 feet.

**DIRECTIONS FOR SPITHEAD, &c.—From Eastward.**—From abreast the Boulder bank, at a distance of half a mile, and having Chichester church spire on with, or open westward of Medmery barn, the course to Spithead will be about N.W.,

and the distance to abreast the Warner lightvessel, about ten miles. The Nab lightvessel lies N.W.  $\frac{3}{4}$  W.  $12\frac{8}{10}$  miles from the Owers lightvessel, the Boulder buoy being exactly midway on the same line of bearing: therefore the course to be steered for the Nab lightvessel will be dependent on the distance the vessel passes outside the Owers lightvessel. On approaching the Nab lightvessel, a ship of moderate draught might bring Kickergill tower in one with the middle of fort Monkton, N.N.W.  $\frac{1}{4}$  W. and proceed with these leading marks through to Spithead; but ships of heavy draught should pursue the route recommended, eastward of the Nab lightvessel.

As it not unfrequently happens that Kickergill tower and fort Monkton are difficult to identify from haze, or are partially hidden by shipping at Spithead, it should be borne in mind that Spit fort just open eastward of Horse fort N. by W.  $\frac{3}{4}$  W. will lead vessels of even large draught in safety to a mid-channel position between the Dean and Dean Elbow buoys, whence there will be no difficulty in picking up the leading marks for proceeding to Spithead. In this route the least water will be  $5\frac{1}{2}$  fathoms.

If any of the Dean buoys are absent, Ashey Down tower should not be opened northward of St. Helen's mark, until the six clumps of trees on Portsdown hill come on with Cumberland fort, or Portsmouth church comes open westward of Southsea castle; Kickergill tower will then be on with the centre of fort Monkton, and may be used as a leading mark as before directed.

Ordinary ships working into, or out of Spithead, should observe that the turning mark is Kickergill tower from end to end of the barracks in fort Monkton, but large vessels should keep the tower always about twice its breadth within the end, when in the vicinity of the Warner, until they are at least two cables northward of the lightvessel. They may stand towards the Dean into 8 fathoms, to St. Helen's roadstead into 8 or 7 fathoms, to the Warner into 15 fathoms, to the Elbow into 9 or 8 fathoms, to the Horse into 11 fathoms, and towards No-mans-Land into 17 or 16 fathoms. If working in, and standing towards the Warner or No-mans Land, they must be sure to tack the first shoal cast, for both sands are steep, and the ebb tide sets strongly over them. If working out, they should not get nearer the Horse than the depth of 12 fathoms, nor to the Elbow than 9 fathoms, because the flood-tide sets strongly over them. Horse and No-mans-land forts are of great service when working in, standing as they do, near the edges of their respective shoals; a strict attention to the lead is always necessary.

The limits of the best anchorage at Spithead are, Southsea castle from N.E. to E. by N., and Gilkicker point from N.N.W. to N.W. A good berth for large ships is in from 10 to 12 fathoms water, with Kickergill tower on with the red and white mile mark on the western end of fort Monkton N. by W.  $\frac{3}{4}$  W.; and the lighthouse on Southsea castle on with north end of Spit fort N.E. by E.  $\frac{1}{2}$  E.; but vessels of moderate draught may berth themselves near the Spit sand, in about 7 fathoms, taking care not to open Kickergill tower eastward of the east end of Fort Monkton barracks.

**From Westward.**—From about a mile off Dunnose to the same distance south of the S.E. Princessa buoy the course and distance will be E. by N.  $\frac{1}{4}$  N.  $6\frac{3}{4}$  miles, varying according to the direction of the wind and set of the tide. The Princessa will be avoided by keeping the red clay cliff, next westward of Culver cliff, open southward of the latter; or the sharp northern shoulder of Appuldercomb hill in line with Shanklin railway station, W.  $\frac{1}{3}$  N., until abreast the S.E. buoy of the Princessa.



About half a mile outside the Princessa depths of 7 to 8 fathoms at low water will be maintained, the nature of the bottom being changeable, but generally gravel and broken shells, interspersed with numerous patches of foul ground. Nearly abreast the Nab, and thence to the New Grounds, less water may be expected, and even an occasional cast of as little as 5 fathoms, but almost invariably gravel and broken shells.

After rounding the S.E. Princessa buoy, the vessel, if of moderate draught, may haul to the northward, and steer about mid-channel between Bembridge ledge and Nab rock, with St. Jude's church (Southsea) just open east of Horse fort N.  $\frac{1}{3}$  E., or with the Warner lightvessel bearing North; the least water in this route is  $4\frac{1}{2}$  fathoms; St. Jude's church N.  $\frac{1}{3}$  E. will lead eastward of the Warner lightvessel, up to the line of the leading mark into Spithead, which is Kickergill tower on with the middle of fort Monkton barracks, bearing N.N.W.  $\frac{1}{4}$  W. After passing No-mans Land and Horse forts, a suitable berth for anchorage may be selected according to circumstances.

There is an available channel for small vessels between Nettlestone point and the Warner shoal, the leading mark for which is Kickergill tower on with No-mans Land fort, N. by W.  $\frac{1}{3}$  W.; this will lead through from seaward, east of the Princessa shoal, inside the Nab rock, and Warner, until Spit fort and the round tower at Portsmouth point are in line N.  $\frac{1}{2}$  E.,—the latter mark leads into the fairway channel to Spithead. The least water in the above route,  $3\frac{1}{2}$  fathoms, is inside the Warner shoal.

A ship of large draught, distant about a mile southward of the S.E. Princessa buoy, should steer northward and eastward, but at the same time avoid passing northward of the Princessa clearing mark,—the sharp northern shoulder of Appuldercomb hill in line with Shanklin railway station W.  $\frac{1}{3}$  N.—until Nab lightvessel bears N. by E., when the course may be directed for her; by steering thus, all the shoal patches of 5 fathoms and under, in the vicinity of the Outer Nab, will be avoided. After passing about a cable eastward of the lightvessel, they should steer for No-mans Land fort about N.W.  $\frac{1}{3}$  N. until Kickergill tower comes on with the middle of fort Monkton N.N.W.  $\frac{1}{4}$  W., and then proceed with these marks on until arrived at the anchorage at Spithead.

On account of the velocity of the spring tides through the main channel into Spithead, cutters and vessels of small draught find it frequently to their advantage to run over the Horse sand; but to do this the rise of the tide should be carefully considered. From half flood to half-ebb a vessel of 12 feet draught and under may borrow on this sand so long as Blockhouse fort is open of Southsea castle; and if under 9 feet she may do so from  $\frac{1}{4}$  flood to  $\frac{3}{4}$  ebb, as the shoalest water outside of this line at springs is about 7 feet.

**At Night,** a vessel of moderate draught, from abreast Dunnose, should steer eastward with St. Catherine light just open of the land bearing about W. by N., until the Nab lights bear N.E.  $\frac{1}{2}$  N., taking care at the same time not to get into a less depth than 10 fathoms; or being about a mile off Dunnose, an E. by N. course will lead about the same distance outside the Princessa. When the Nab lightvessel bears N.E.  $\frac{1}{2}$  N., it should be steered for on that bearing, until the Warner light bears N.N.W., when the course must be directed for it. After rounding the Warner lightvessel at a convenient distance on its eastern side, proceed in mid-channel about N.N.W. between the lights on Horse and No-mans Land forts, and anchor at Spithead in about 6 fathoms, with Warner light S. by E.  $\frac{1}{2}$  E., and the green light on Southsea castle N.E.  $\frac{1}{2}$  E.; or otherwise as most convenient.

The above route will skirt the Outer Nab rock, but even supposing that patch be crossed, the least water will be  $4\frac{1}{2}$  fathoms.

When Southsea castle light is first seen N. by E., it will appear *red*; the vessel will then be westward of the Horse sand, and have the harbour channel open. The line of bearing on which the light changes from red to green is N.E. by N.

Large vessels off Dunnose (with St. Catherine light just in sight W. by N., and the Nab lights N.E.) should steer N.E. by E.  $\frac{1}{2}$  E. until the Nab lightvessel bears N. by E., when they must steer for it on that bearing; by doing so all the shoal patches of 5 fathoms and under in the vicinity of the Outer Nab will be avoided. After rounding the lightvessel at a convenient distance on its eastern side, the course to Warner lightvessel is N.W.  $\frac{1}{2}$  N. When Spit fort light opens out westward of Horse fort light, a N.N.W.  $\frac{1}{2}$  W. course will lead between the lights on Horse and No-mans Land forts, and through to Spithead.

**Bembridge Fort and Light.**—At the north-east extremity of the bank extending from the South point of Brading haven is Bembridge fort; the fort is about 50 yards in diameter, and from its north-east side, at an elevation of 38 feet, is exhibited a small *fixed green* light.

**ST. HELENS ROAD**, off the east end of the Isle of Wight, is well sheltered from all but south-east winds, with excellent holding ground of mud and stiff blue clay, suitable for vessels of any draught. The best position for heavy ships is in 7 or 8 fathoms, with Ashey Down tower in line with Bembridge fort W.  $\frac{1}{3}$  N., or St. Helens sea-mark, just open southward of Bembridge fort; and the spire of St. Jude's church, Southsea, just open west of Horse fort N.  $\frac{1}{2}$  E. Smaller vessels may anchor further in, according to draught or water.

For ships of moderate draught there is a clear and safe channel, half a mile wide, between the N.W. buoy of the Princessa and the shore, and between the Bembridge ledge and Nab rock buoys, which may prove useful in fine weather and with leading winds to vessels intending to anchor in St. Helens road; but under no circumstances should ships attempt to work through, for no good turning marks can be given, and as the tides are strong, if caught with light and baffling winds near Bembridge ledge, they would be in some danger, particularly as the western stream, when free from the influence of the channel, has a strong tendency to set over that shoal.

As from the offing, the saving of distance by this channel to St. Helens road is scarcely appreciable, it is not recommended, especially as the course through the channel inside the Princessa is dependent on a single bearing of the Nab lightvessel, whose position, possibly affected by heavy gales, should not be depended on for such a purpose.

In the event, however, of circumstances rendering such a step advisable, bring the Nab lightvessel E. by N.  $\frac{3}{4}$  N. and it will lead over Culver spit in  $4\frac{1}{2}$  fathoms, and through the channel in from 5 to 6 fathoms. When St. Jude's church (Southsea) just opens eastward of Horse fort N.  $\frac{1}{4}$  E., steer with these objects on, or with the Warner lightvessel bearing North: either of these marks leads through in about mid-channel between Bembridge ledge and the Nab rock, the least water to be crossed being  $4\frac{1}{2}$  fathoms. When Ashey Down tower comes in line with Bembridge fort W.  $\frac{1}{3}$  N., or St. Helens sea-mark is just open southward of the fort, a vessel may anchor in St. Helens road as already directed, or proceed on for Spithead, rounding the Warner lightvessel on her eastern side, and then with the leading marks on,—Kickergill tower in line with the centre of fort Monkton N.N.W.  $\frac{1}{4}$  W.—select a convenient anchorage.

This channel should not be attempted at night; but if circumstances render

such a step unavoidable, bring the Nab lightvessel E. by N.  $\frac{3}{4}$  N., and steer for it on that bearing, until the Warner lightvessel bears North, when steer for it, and either anchor in St. Helens road when the *green* light on Bembridge fort bears W.  $\frac{1}{2}$  N., or proceed on for Spithead, rounding the Warner lightvessel on its eastern side.

Vessels of heavy draught intending to anchor in St. Helens road, after rounding the Nab lightvessel at a moderate distance on her eastern side, should steer for Horse fort, until Bembridge fort bears W. by N.  $\frac{1}{2}$  N., and then alter course to W.N.W., making allowance for tide; by following the above directions a depth of not less than 5 fathoms at low water will be preserved, and anchorage can be obtained in 7 or 8 fathoms, as previously directed. Large vessels in turning into St. Helens road should not go southward of the line of Foreland farm in one with the eastern chalk-pit on Bembridge down, W. by S.  $\frac{1}{4}$  S., nor northward of the line of the summit of Brading down in one with St. Helens sea-mark, W.  $\frac{1}{2}$  S.; the former mark clears the Nab shoals and New Grounds, and the latter leads southward of St. Helens patch.

When turning into the roadstead at night, and having the Nab lightvessel southward of E.  $\frac{1}{2}$  S., a vessel, when standing to eastward, should go about as soon as the Warner light bears N.W. by W., which will be a sufficient warning of her approach to the Dean Tail. In standing to the westward, the Warner light N.  $\frac{1}{2}$  E. is quite far enough.

**BRADING HAVEN** is a small place at the bottom of St. Helens roadstead, where only the smallest vessels can find accommodation. The channel, narrow and intricate, is between two sandbanks, which dry out a considerable distance; at low water it is not navigable, even by boats, but at high springs the least water in it is from 12 to 13 feet. Vessels of 5 or 6 feet draught lie afloat at low tide in a hole just within the points of the entrance. It is high water here on the days of full and change at 11h. 20m., vertical rise 14 feet.

**PORTSMOUTH HARBOUR.**—The channel to Portsmouth harbour is between the Horse sand on the east, and the Spit sand on the west side. The edge of the Horse sand trends about S. by W. from Southsea castle, and is marked by a *green* buoy on the Boyne shoal, which should always be passed on its western side; the shoal is caused by the wreck of H.M.S. *Boyne*, over which the depth is only 19 feet. The Spit sand (parts of which are known as the Harrow and Hamilton banks, and the Elbow and the Ridge) has the form of a triangle, the base of which occupies the old coast from Gilkicker point to the Blockhouse at the west point of the harbour's entrance, the apex or spit being  $1\frac{1}{2}$  miles south-eastward of the hospital, and marked by a refuge bell buoy, chequered black and white, moored in 22 feet water. The general depth of water over the Spit sand is from 7 to 10 feet, but the parts above mentioned become dry, or nearly so at very low tides. The inner bar is formed by a gravelly bank connecting the eastern edge of the elbow of the Spit sand and the outer part of the East sand,—a sand which commences at the mouth of the harbour and runs nearly parallel with the beach as far southward as the Swatchway beacons, just northward of Southsea castle; over this sand the depth is from 5 to 10 feet. At low water spring tides the depth on this bar is  $17\frac{1}{2}$  feet, so that the depth at high water springs is 30 feet, and at high water neaps  $27\frac{1}{2}$  feet.

*Tides.*—At the dockyard it is high water on the full and change days at 11h. 41m. springs rise  $12\frac{1}{2}$  feet and neaps 10.

*Outer Spit Buoy.*—This chequered black and white buoy (moored in  $3\frac{1}{2}$  fathoms marks the outer end of the Spit extending in a general S.S.E. direction from the shore



between Blockhouse and Gilkicker points, and forming the western boundary of the channel into Portsmouth harbour. Between it and the bell (refuge) buoy, there is a depth over the bank of 20 to 23 feet, but ships of heavy draught, on entering or leaving Portsmouth harbour, should, unless near high water, pass southward and eastward of it.

**Spit Fort and Light.**—A short distance within the 3-fathom outer edge of the Spit sand is Spit fort, about 70 yards in diameter (and now in course of construction). A small *fixed* light is shown from it at about 34 feet above high water.

**Time Ball.**—Greenwich mean time is shown daily at Portsmouth by the dropping of a black ball from the staff of the semaphore in the dockyard at an elevation of 176 feet above the mean level of the sea. The ball is hoisted half-way up the staff at five minutes before, and close up at two minutes before 1h. P.M., and is dropped at the instant of 1h. P.M. of Greenwich mean time. The position of the semaphore is lat.  $50^{\circ} 48' N.$ , long.  $1^{\circ} 6' 15''$ , or 4m. 25s. West from Greenwich.

**Lights.**—A *fixed* light, 51 feet above high water, exhibited from a lighthouse in the north corner of Southsea castle, is visible about 9 miles. It is bright *red* over the channel between the Spit refuge buoy and Horse fort (between the bearings of S. by W. and S.W. by S.), and *green* westward of the Spit buoy (between S.W. by S. and W.  $\frac{1}{4}$  S.). Approaching from eastward it is first seen on the bearing of N. by E., and is of a faint *red* colour; on that bearing it leads about four-tenths of a mile westward of the Horse fort, and nearly hits the Boyne buoy.

A *red* light is exhibited at each outer end of the Clarence Esplanade pier near the King's Rooms on Southsea beach, to facilitate the approach of steam-vessels at night; —a *green* light at the north outer end, and a *red* light at the south outer end of Victoria pier, at the bottom of High Street, Portsmouth; and *red* or *green* lights are shown at the landing places and piers within the harbour.

**Bar Knolls.**—On the outer bar of Portsmouth harbour, an 18-foot knoll of loose shingle is marked on its western edge by a black can buoy in 19 feet water. A similar knoll, with 22 feet water, lies S.W.  $\frac{3}{4}$  S. from it.

**Inner Bar Buoys.**—There are no buoys to mark the western edge of the Spit, but the channel on the eastern side of the sand is clearly pointed out by seven buoys, chequered *black* and *white*. The two outer buoys, the outer Spit and Spit refuge, have been already mentioned; the others are numbered consecutively from 1 to 5, commencing from the S.E.

Two *black* buoys (numbered 1 and 2) on the western edge of the East sand, must be left on the starboard hand in entering; No. 1 is the southern or outer buoy. There is also a *black* buoy, with the words, "*Notice—No vessel to anchor in the fairway*" on it, moored in 4 fathoms at the southern extremity of East sand.

Although the channel of the inner bar is narrow, its limits are well defined by the five buoys—viz., Nos. 1 and 2 black on the starboard hand,—and Nos. 3, 4, and 5, chequered black and white on the port hand.

**Directions.**—The passage for large vessels is between the Spit inner refuge buoy and Bar knoll black buoy, thence past Southsea castle and over the bar, between the black buoys on the western edge of East sand and the chequered black and white ones on the eastern edge of the Spit sand. Small vessels from westward may cross the Spit sand by bringing the beacons on Southsea beach in line, until the small white obelisk (on the beach a little southward of the baths) comes on with the east end of the trees on Portsmouth lines; this will insure a depth of about 7 feet at low water. The mark for crossing the inner bar in the

deepest water is the red bar beacon on Blockhouse fort in one with the black beacon on the Gosport fortifications N.N.W.  $\frac{1}{4}$  W.

A large ship should not attempt to enter the harbour without the assistance of a pilot, although a small vessel may, by attending strictly to the buoys, tides, &c., enter without such aid. It should, however, be taken as a general rule that it is utterly useless to attempt to enter against the tide, unless assisted by steam or a commanding breeze. When sailing in with the tide, particularly at its strength, which on springs is 4 knots, the greatest caution should be used, on account of the usually crowded state of the harbour. The best time for entering is near slack water, about half an hour before high water, or upon the slack, which occurs between the 2nd and 3rd hour's flood, which lasts about  $\frac{3}{4}$  of an hour. The flood is strongest between the 5th and 7th hour, and the ebb at the third hour. In the harbour the flowing continues about 7 hours, and a narrow stream runs in 15 or 20 minutes after high water at the dockyard.

**STOKES BAY and Lights.**—Stokes bay lies westward of Gilkicker point, and is much frequented by merchant ships, especially in war time, as there is good anchorage in it in 4 to 9 fathoms at from half a mile to 2 miles from the point. From the shore of the bay a shallow flat extends a short distance, and runs along the coast northward towards Southampton water.

A pier, 600 feet long and 60 feet broad, runs off from the shores of this bay, about half a mile northward of Gilkicker point. The pier-head, which is the terminus of the South-western railway, is diamond-shaped, 240 feet long and 90 feet broad, and the depth alongside it is 6 feet at low water springs. This pier and the new pier at Ryde are in conjunction with the South-western railway. A *red* light is shown on the east and west end of the pier, and a central *red* light is also shown when a steamer is expected.

On the shore of Stokes bay there are beacons indicating a measured mile, and two red beacon buoys have been moored outside in the roads for the same purpose—viz., as a means of testing the speed of steamers. These buoys lie in a N.W. and S.E. direction, and are placed a cable from each end of the measured mile. As the course between the buoys is not more than  $1\frac{1}{2}$  cables outside a bank in Stokes bay, on which the depth is only  $3\frac{3}{4}$  and 4 fathoms at low water springs, vessels of heavy draught should not turn inwards nor towards the shore of the bay.

**RYDE.**—From Nettlestone point the shore trends in a north-westerly direction  $7\frac{1}{2}$  miles to Cowes, and is fronted by sands and shallow banks.

At the distance of  $5\frac{1}{2}$  miles is the town of Ryde with its piers. The western pier, 800 yards long and 22 feet wide, projects in a northerly direction from the town, and at its head has a depth of about 7 feet at low water springs. A *fixed* light, visible about 6 miles, is shown at the end of this pier.

The eastern pier is about 200 yards from the western pier, and extends off the same direction. It is 400 yards long and 30 feet wide, and the depth at its head is  $4\frac{1}{2}$  feet at low water. Five sets of screw moorings are to be laid down on each side of this pier.

On the shore between the piers is the entrance of a tidal basin, 220 feet long, 110 feet wide, with  $8\frac{1}{2}$  feet in it at high water springs, and  $5\frac{1}{2}$  feet at neaps. At the head of the tidal basin there is a floating basin, 250 feet long, 20 feet wide at entrance, and with 8 feet water over the sill at high springs, and 5 feet at neaps.

It is high water, full and change, at Ryde pier at 11h. 20m., and low water at 4h. 15m.: springs rise  $13\frac{1}{2}$  feet, and neaps 10 feet.

**Quarantine Ground.**—The limits of the Quarantine ground off the town of Ryde

are marked by five buoys, the three outermost of which are a mile from the shore. The deepest water, near the Lazaretto, is 4 to 5 fathoms. Merchant vessels in pratique generally anchor between the Outer and Inner spits of the Mother bank and the Sturbridge, in 5 to 11 fathoms water, over good ground, and sheltered from southerly winds, with Ryde bearing from S.W. to S.S.W.

**Mother and Peel Banks.**—The indent of the coast between Ryde and Old Castle point is occupied by an extensive bank of from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms water, the eastern part of which is known as the Mother and the western the Peel bank. Near Old Castle point its outer edge, 5 fathoms, is only distant about  $\frac{1}{4}$  mile; abreast of King's Quay creek (where there is a *red* buoy moored in 20 feet) 1 mile; and off the mouth of Wootton creek  $1\frac{1}{4}$  miles from the coast; thence it continues until off the town of Ryde, where it terminates in two spits, named the Outer and Inner spits. Besides the red buoy there is a *black* one (the Yacht buoy) about half-way between it and Old Castle point.

**Ryde Middle Shoal.**—This sand lies between Gilkicker and Old Castle points. It is  $2\frac{1}{4}$  miles in length N.W. by W. and S.E. by E., about a quarter of a mile wide, and has on its shallowest part 2 fathoms water. At its east end it is guarded by two buoys, of which the northernmost is *red* and carries a staff and globe, and the southernmost is chequered *red* and *white*; at its west end is a buoy horizontally striped *red* and *white*.

The Ryde Middle has 5 and 6 fathoms water near it on both sides, and may be passed on either side, as most convenient. The mark for the passage on the *north* side is Southsea castle open north of fort Monkton; and, on the *south* side, between it and the Peel bank, Egypt point just open of Old Castle point,—it is necessary to take care when approaching the latter point to steer out midway between the red buoy off it and the western Middle buoy. The red buoy is moored in 4 fathoms, and marks the edge of the shoal extending from Old Castle point.

**COWES.**—Cowes is a place of great resort for bathing and yachting, and has considerable trade. It is also noted for its ship-building yards and dry docks. The largest dock (1870) is 330 feet long, 56 feet wide between gates, and has 16 to  $17\frac{1}{4}$  feet water over the sill at high water springs; the other dock is 140 feet long, 36 feet wide between the gates, and has 12 to 13 feet water over its sill. There is also a patent slip, sufficiently large to receive a ship of 500 tons.

The anchorage in Cowes roads is safe, and much resorted to by merchant vessels waiting for orders. The usual position is in from 5 to 7 fathoms, with Cowes castle W. by S  $\frac{1}{2}$  S., and the sea-mark on Old Castle point S.E. Pilots can be had either for Cowes harbour or for Southampton Water.

Cowes harbour has from 9 to 14 feet water in it at low tide. On full and change days it is high water at 10h. 45m. and again at 11h. 45m.; springs rise about  $13\frac{1}{2}$  and neaps  $9\frac{1}{2}$  feet. A buoy marks the eastern point of the entrance; it is placed on the extremity of the bank on the eastern side of the channel. The passage in, which is on the west side of the buoy, is only half a cable wide, and in it the tide runs with great strength. The tide flows into the harbour  $7\frac{1}{4}$  hours, and ebbs about  $4\frac{1}{2}$  hours.

**Prince Consort Shoal.**—This shoal (34 to 22 feet) is about a cable long E.N.E. and W.S.W., and has close to it all round a depth of about 6 fathoms. It is marked by a *red* buoy, moored in 4 fathoms, at about 33 yards northward of the 22-foot patch. To pass northward of it, keep Ryde pier open of Old Castle point.

**Bramble Bank.**—This is a large and dangerous shoal at the entrance to Southampton Water. It is marked by three buoys: *red* at its N.W. angle;



chequered *red* and *white*, and bearing a beacon, at its S.W. extremity; and *red* and *white* (vertically striped) at its S.E. corner; all which are moored in about 4 fathoms. The centre of the shoalest part of the Bramble (dry at low tide) is one-third of a mile E.S.E. from the red buoy; and the East knoll, over which there is but  $4\frac{1}{2}$  feet at the same period of tide, lies N.W.  $1\frac{1}{4}$  miles from the East Bramble buoy. Along the southern edge of this bank there are 8 and 9 fathoms water at two cables off; in the channel, between it and the extensive shoal which runs off from the eastern shore,  $2\frac{1}{4}$  to 3 fathoms; and between it and the Thorn,  $3\frac{1}{2}$  fathoms water.

**Thorn Knoll.**—The Thorn Knoll, a shoal of  $2\frac{1}{2}$  fathoms, is nearly half a mile long in an East and West direction, and about 2 cables broad. Its centre is about a quarter of a mile N.N.E. from the Bramble N.W. buoy. A *red* buoy guards the north end, and a *red* and *white* (horizontal stripes) buoy the south-west end of the knoll. In the channel between it and Calshot spit, the depth is 5 to 10 fathoms.

**Calshot Spit** runs off from Calshot castle. Its edge is marked by two buoys; one, *black*, a refuge buoy, lying on its south-east extremity, at a mile S.  $\frac{1}{2}$  E. from the castle, and the other, chequered *black* and *white*, on its eastern edge, with the castle bearing N.N.W.  $\frac{3}{4}$  W., nearly half a mile distant.

**Lightvessel.**—The lightvessel near the spit of Calshot castle is moored in  $5\frac{3}{4}$  fathoms, and shows a *revolving* light, which attains its greatest brilliancy *every minute*, and is visible in clear weather about 9 miles.

**Hill Head Buoy.**—This *red* conical buoy lies in 3 fathoms water, on the extremity of the shoal extending from the shore eastward of Calshot lightvessel, and a short distance from the north-west edge of the Bramble shoal. It is on the line between the East Bramble buoy and Calshot castle, and almost midway between them.

**SOUTHAMPTON WATER** is one of the finest harbours in the kingdom, with depth enough for the largest vessels; it is quite landlocked, and its approaches are so well protected as to prevent the rise of any very rough sea. From Calshot castle the distance to Southampton is 5 miles, and the direction almost N.N.W. The channel is nearly half a mile wide throughout, between banks of soft mud, which cover at high water, and are buoyed with red buoys on the eastern, and black on the western side. There is sufficient water for the largest ships if the simple precaution be taken to keep between the line of buoys. For the first  $3\frac{1}{2}$  miles up from Calshot castle the depth is 5 to 9 fathoms at low tide; but at  $1\frac{1}{2}$  miles from the town (in mid-channel between Hythe and Netley abbey) there is a shoal of 12 feet named Netley, having a 4-fathom channel on its western side, and a 3-fathom one on its eastern. Thence to the bar the depth is 4 and 5 fathoms. Here the rivers Itchen and Teste unite; the former leads to the tidal basin and eastward of the town, and has a depth of  $2\frac{1}{2}$  and 3 fathoms at low water; the latter leads to the Royal pier, and west of the town to Redbridge, and has a depth of from 2 fathoms on the bar to  $2\frac{1}{3}$  and 3 fathoms, but above the pier the channel gradually decreases in width and depth, and near Redbridge becomes almost dry at low tide. The Itchen is not navigable above Southampton.

The tidal basin at Southampton is justly considered to be inferior to none in the world. It comprises an extent of about 16 acres, and has an open entrance 150 feet wide, accessible at all hours of the day and night. The depth is never less than 18 feet at the lowest spring tides, which, with a rise of tide of about 13 feet, makes a depth at tide time of fully 30 feet. Besides the close

dock, there are extensive dry docks which will take in the largest steamers for repair.

**Tides.**—The first high water at Southampton, on the days of full and change, is at  $10\frac{1}{2}$ h., and the second at  $12\frac{3}{4}$ h., and low water at 4h.; springs rise 13, and neaps  $9\frac{1}{2}$  feet. At Calshot castle the time of high water is  $11\frac{1}{2}$ h., the rise is the same as at the town.

**Lights.**—Two *fixed* lights are shown from the Royal pier at Southampton; and when in line, the channel will be open from the bar end to the pier. There are also two *fixed* lights on the piers of the docks (dark red on the north, and red on the south pier); when in one, they lead up the river Itchen in 15 feet water at low tide.

**Directions.**—There are two channels into Southampton water, one, with 14 feet in it at low water springs, on the eastern side of the Bramble, and the other, with 5 to 10 fathoms in it, on the north-west side of that shoal; the latter, the main channel, being considerably narrowed by the Thorn Knoll, is somewhat intricate for vessels of large draught. The channel eastward of the Bramble can only be used by vessels of moderate draught, except at high water, when those drawing 22 or even 23 feet may avail themselves of it.

*The Western Channel.*—Having arrived between the Lepe Middle shoal and Egypt point, steer for Calshot lightvessel on an E.N.E. bearing—the lightvessel will then appear a little open south of the black refuge buoy on Calshot spit;—after passing about 2 cables westward of the lightvessel, a N. by W.  $\frac{1}{2}$  W. course will lead to Southampton. Keep in mid-channel and leave the black buoys on the port hand, and the red buoys on the starboard.

*The Eastern Channel.*—Pass 2 cables eastward of the east Bramble buoy, steer about N.W.  $\frac{1}{2}$  N. for Hill head buoy, which should be passed close-to on its southern side, and when midway between it and Calshot spit (refuge) buoy, shape a course to pass 2 cables westward of the lightvessel, and proceed as before.

*At Night.*—Having passed through the Needles channel, the white light in the high lighthouse at Hurst kept West will lead in mid-channel up the Solent until Calshot light bears E.N.E., which bearing must be maintained with great precision in order to pass between Thorn Knoll and Calshot pit. Calshot light S. by E.  $\frac{1}{2}$  E. will lead to Southampton; but as the tide runs strong, it need scarcely be observed that a stranger should not attempt this navigation at night without a pilot.

The two lights on the dock pier heads kept in one, N.N.E.  $\frac{3}{4}$  E., lead up the river Itchen to the entrance of the docks. The two lights on the Royal pier in one, lead to the pier-end.

When the wind is between S.S.W. and E.S.E. it is fair for going up Southampton Water. The ebb tide continues  $3\frac{1}{2}$  hours, and falls fastest 2 hours after the second high water at Southampton, at which time the stream runs strongest in the fairway.

**SOLENT.**—The Solent is that part of the Isle of Wight channel between Cowes road and Hurst point and castle. On its northern side there are long mud flats, running off from the shore, and in the fairway are some shoal spots, named the Solent banks; besides which, the only dangers are several rocky ledges off the island shore, and named respectively Gurnet, Saltmead, Hampstead ledges, and Black rock. A description of these, and of Beaulieu river, Lymington, and Yarmouth, with some general directions for the Solent, follow in their order.

**Lepe Middle.**—This is a long narrow bank, of from 10 to 12 feet water on the north side of the Solent, nearly opposite Beaulieu river. It does not project beyond a mile from the shore,—the same distance as the other mud flats between Stansore point and Hurst castle,—and lies immediately without the flats, facing that river. Being a turning point into Southampton Water, its eastern end is marked by a conical buoy (with *red* and *white* vertical stripes) in 4 fathoms.

To clear the Lepe Middle on the *east* side, in  $4\frac{1}{4}$  fathoms, bring Eaglehurst or Luttrell's tower open east of Stansore point, N.E.  $\frac{1}{4}$  E.; and on the *south* side, in 4 fathoms, the coast-guard station, at Hill head, rather nearer Nelson's monument than the large chalk-pit on Portsdown hill, E.  $\frac{3}{4}$  N.

**BEAULIEU RIVER.**—The entrance to this river lies between Stansore point and the buoy of Lepe Middle; it has a mud bar, over which at low water the depth is only 2 feet, but immediately within it are 4 and 3 fathoms nearly up to Buckler's hard, where spring tides rise 10 feet. Two *red* beacons in one lead over the bar in the deepest water, after which the channel is pointed out by perches.

**Gurnet, Saltmead, Hampstead Ledges, &c.**—Off Gurnet and Hampstead points, are ledges of rocks extending out nearly a quarter of a mile from the shore. Besides these, are the Saltmead ledge, and Newtown gravel banks, with other dangers lying between Gurnet point and Newtown river, so that this part of the coast should not be approached nearer than half, or three-quarters of a mile.

Saltmead ledge and Newtown gravel bank begin abreast Thorness wood, and line the shore as far as Hampstead point; they reach nearly half a mile from the shore, and have 9 to 12 feet water upon some parts of the outer edge, and 7 to 8 fathoms close to. A *red* can buoy in 5 fathoms now guards the north-east edge of this ledge. The Mount trees at Yarmouth in one with Hill farm trees, W.  $\frac{1}{2}$  S., clears both this ledge and the gravel banks on the east side of the entrance of Newtown river.

The eastern end of the Gurnet ledges is marked by a *red* can buoy moored 2 cables off shore, in 8 fathoms water. Egypt house open north of the old limekiln, E.  $\frac{1}{4}$  N., leads outside the buoy, but will not clear the rocks in Gurnet bay eastward of it.

A *red* can buoy also marks the outer edge of Hampstead ledge. It is moored in 5 fathoms at a quarter of a mile from the shore.

**Solent Banks.**—These are a series of patches of 4 to  $4\frac{3}{4}$  fathoms, lying in mid-channel, opposite the entrance to Newtown river. The least water found upon them is 22 feet, which lies with the western edge of the Hill trees (behind Yarmouth) in one with Yarmouth sand house, W.S.W.  $\frac{1}{3}$  W.; and the coast-guard within Fish-house point, the east point of the entrance to Newtown river, S. by E.  $\frac{3}{4}$  E. Close to these patches are 6 to 7 and 8 fathoms.

**LYMINGTON ROAD and RIVER.**—The entrance to Lymington river is  $2\frac{1}{3}$  miles E.N.E. from Hurst castle. In the channel, which is very narrow, the depth is  $2\frac{1}{2}$ ,  $1\frac{1}{2}$ , 2, and one fathom at low water; at the town it is 17 feet at high springs, and 14 feet at neaps. A can buoy, chequered *red* and *white*, marks the spit which runs off from the western point of the entrance, and a large ball beacon (Jack in the Basket) just within, also stands on the western side of the channel. When entering bring Lymington church in one with Jack in the Basket, N.N.W., and keep it so until near the chequered buoy, which must be passed pretty close, leaving it, as well as the booms on the west side of the channel, on the port hand.

Small vessels will find Lymington road a better place to anchor in than Yarmouth



road; the best position is in 5 fathoms, sand and mud, with Jack in the Basket on with Lymington church, N.N.W., and Hill trees in line with Norton house, S.W.  $\frac{1}{2}$  W. To avoid the Lymington banks at night, keep the Needles light shut in with Cliffs-end fort.

**YARMOUTH** is a convenient little place for small vessels. It has an excellent quay, and is well sheltered by a substantial breakwater. On the days of full and change it is high water at 10h., and again at 12h.; the springs rise 7 feet, and neaps  $6\frac{1}{2}$  feet.

Vessels of moderate draught can anchor about a third of a mile from the shore in 7 fathoms, with Sconce point mast W. by N., and Yarmouth church and castle masts in a line; here there is little tide. Large vessels must take up a berth farther out in 8 or 9 fathoms, where the tide runs E.S.E., and W.N.W. at the rate of  $2\frac{1}{2}$  or 3 knots with springs. These anchorages are sheltered from all but easterly winds.

When approaching Yarmouth roads from westward care must be taken to avoid the Black rock (6 feet under water) and the foul ground which extends from it. Its position, which is about a quarter of a mile westward of the anchorage, is indicated by a *red* can buoy, moored in 10 fathoms, a little outside and northward of the rock. Should the buoy be gone, and when in the vicinity of the ledge, keep the mast on Sconce point southward of West. A short distance outside the Black rock there is a deep hole (known as Fiddler's race) which boats must avoid when it blows hard during a weather tide, as it occasions a great overfall and sometimes an alarming sea.

*Lights*.—Two *fixed* lights are exhibited at Yarmouth, the outer one *green*, from a lamp-post on the quay near the castle wall, and the inner one *white*, from the corner of a house. They are 30 yards apart, each 12 feet above high water, and when in one, S.S.W., lead into the harbour in 14 feet at high water springs.

**HURST ROAD**.—Owing to the exposure to E. and S.E. winds, and the uncertain eddies which render a clear anchorage almost impossible, Hurst road is seldom used. Small vessels, however, anchor out of the way of the tide, but not nearer the beach than to have the middle Needles rock on with the eastern side of Hurst castle, or just open of the point.\*

**HURST LIGHTS**.—The two lighthouses on Hurst point are circular in form (the lower one painted red), and 52 and 85 feet in height. They stand 223 yards apart, N.E. by E.  $\frac{1}{2}$  E. and S.W. by W.  $\frac{1}{2}$  W., the lower light being to the south-west; and each exhibits a *fixed* light, elevated respectively 46 and 76 feet above high water, and should be visible in clear weather from distances of 10 and 13 miles: when bearing northward of N.E.  $\frac{1}{2}$  E. they are shut in by the Needles rocks. There is also, in the eastern face of the high lighthouse, a *fixed* leading light, which shows up the Solent, between the bearings of W. by S. and W.  $\frac{1}{2}$  N.†

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\* An electric submarine cable (about 400 yards westward of the west wing of Victoria fort on Sconce point) extends in a direct line across the Solent to the central towers of Hurst castle, and vessels are cautioned not to anchor on that line of direction, lest by doing so they damage the cable, or lose their anchors.

There is a telegraph station near Hurst castle, from which the arrival and departure of vessels off the Needles can be signalled to almost any place in England, Scotland, and Ireland, and the continent of Europe. Vessels can also have their numbers reported, or messages forwarded, as they pass the Solent.

† The lower lighthouse on Hurst point is built in by the new fort, the top alone being visible; but outside the fort is placed a red screen which—with the lighthouse in line—fits under the top of the lower lighthouse, and apparently renders the building complete.

**DIRECTIONS.**—In proceeding westward from the anchorage at Spithead, and intending to go *north* of Ryde Middle, steer about N.W. into Stoke bay until the tower or flagstaff of Southsea castle appears well open northward of fort Monkton, E.S.E.; and with this mark on, proceed between the Middle and Bramble shoals until abreast Egypt point, when the course to Hurst is West, and the distance  $9\frac{1}{2}$  miles.

If intending to go *south* of the Ryde Middle, steer westward until Egypt point is just open of Old Castle point bearing W.N.W. nearly; taking care, however, when near the east buoy of the Middle not to keep Egypt point too much open of Old Castle point, for fear of getting too near that shoal. When the west buoy of the Middle bears about N.N.W. steer N.W., or more northerly, to avoid the ledge off Old Castle point, till Egypt point bears W.  $\frac{3}{4}$  N., and then steer W.N.W. till abreast it.

A vessel of large draught turning to windward when proceeding northward of the Ryde Middle, may stand towards the Sturbridge shoal and Gilkicker point to the depth of 10 fathoms at low water, the Mother bank to 7 fathoms, Stoke bay to 9 or 8 fathoms, the Ryde Middle to 7 fathoms, and towards the shore to the same depth; but not nearer the Bramble than 9 fathoms, nor Old Castle or Egypt point than 8 fathoms. Working to the southward of the Ryde Middle, it should not get nearer the Mother and Middle banks than the depth of 7 fathoms. Between Egypt point and Yarmouth, the island may be approached to 8 or 7 fathoms, and the main to 7 or 6 fathoms.

Near Calshot lightvessel the direction of the stream is nearly rotatory, and turns at the same time as in Southampton Water. At the east end of the Bramble, it changes at the same time as at Spithead. In the fairway westward of the Bramble, the flood makes about 1 hour, and the ebb 2 hours later than at Spithead, running 6 hours each way. At the Solent banks the stream turns westward at  $9\frac{1}{2}$  hours, and eastward at 4h. 2m.

**NEEDLES CHANNEL.**—Westward of Sconce point and Hurst castle lies the Needles channel, which is bounded on the eastern side by the western end of the Isle of Wight, Warden and Tinker ledges, and the rocks called the Needles; whilst on the western side is the reef and shoals called the Shingles, &c. The passage between the Needles rocks and the Shingles is usually termed the Needles or South channel; that between the N.E. end of the Shingles and Hurst point is named North channel.

**Warden and Tinker Ledges.**—These are a series of dangers lying along the coast of the Isle of Wight, on the east side of the Needles channel. They are steep, upon which account great caution is necessary to avoid them.

*Warden Ledge* is a cluster of rocks extending nearly half a mile from the shore of Warden point towards Hurst castle. Near the coast it becomes dry at low water. It is, properly speaking, the extremity of a rocky flat which commences at Warden point and extends along the coast nearly as far as Round Tower point, taking in its latter part the name of *How ledges*—to clear it bring Sconce point open north of Round Tower point, E. by N.; but, to clear the outer How ledge and off-lying rocks at Cliff-end, it is requisite to keep the whole of Victoria fort open of Round Tower point. On its extremities there is a *red* can buoy in  $5\frac{1}{2}$  fathoms, just outside the edge of the shoal where the depth is 9 feet at low water.

The *Tinker* is a rocky shoal of 7 to 10 feet, extending nearly half a mile from Warden point, in the direction of W.  $\frac{1}{2}$  N. from the pilot's house on the point; and having close to its extremity a depth of 4 and 5 fathoms. In Totland bay, between

Warden point and Hatherwood point, a shoal of 10 feet lines the shore to one-third of a mile out; and on the west side of Hatherwood point, in Alum bay, are *Five* rocks and other dangers, which, as they are all within a quarter of a mile from the shore, will be easily avoided.

**NEEDLES LIGHT.**—The Needles rocks are very conspicuous, from the peculiarity of their form: the outermost lies about a quarter of a mile from the shore. Between them are passages through which boats occasionally pass. On the outermost rock is a granite lighthouse, which shows a *fixed* light at 80 feet above the sea, visible 9 miles. To an observer at sea, the are illuminated is from N.W.  $\frac{1}{2}$  N., seaward to S.W. by W.  $\frac{1}{2}$  W., so that it is an important light to vessels approaching the Needles channel from southward or south-westward. When bearing between N.W.  $\frac{1}{2}$  N. and East, it appears *red*; between East and E.S.E., *white*,—the southern limit of this white light leads about a mile southward of Durlston head, in a depth of 14 fathoms, and the northern limit clears the Dolphin bank and south-west tail of the Shingles in 4 and 5 fathoms; between E.S.E. and S.W. by W., or over the Shingles bank, it is *red*; and from S.W. by W. to S.W. by W.  $\frac{1}{2}$  W. it is *white*—the latter bearing leads close to the buoy marking Warden ledge. A bell is sounded in foggy weather.

**Bridge reef.**—From the Needles rocks a narrow ledge of 2 fathoms (deepening to 4 fathoms at its extremity) extends nearly three-quarters of a mile in the direction of W. by N.  $\frac{1}{4}$  N. towards the Shingles, and has off its extremity two patches of  $4\frac{1}{2}$  and  $4\frac{3}{4}$  fathoms; this ridge, known as the Bridge, may be crossed in a small vessel, clear of all the dangers within the 2 fathom line, by bringing Hill trees well open of Hatherwood point, E. by N., which mark will also clear the Five rocks under Hatherwood point. Large vessels should not cross it nearer the rocks than to have the south edge of Hill trees E.  $\frac{2}{3}$  N., seen just southward of Warden point; this mark leads in in a depth of from  $4\frac{3}{4}$  to 7 fathoms.

The small trend of the coast comprised between the Needles rocks and Sun corner point south-eastward of the rocks is known as Scratchel bay. In it are the St. Anthony rocks, which are awash; they are a short distance from the shore, within the 5-fathom line. To clear them, as well as to go southward of the Bridge, bring Pepper rock open of Sun corner point, bearing E. by S.

Small vessels should not hug the outer Needles rock too closely, to avoid the ebb by getting into Alum bay, on account of the dangerous sunken rocks which surround it, but should keep at least a cable off.

**Shingles.**—The commencement of this dangerous shoal is about half a mile from Hurst point; it thence extends to the W.S.W. 3 miles, and is nearly half a mile broad. On it the water is very shallow, there not being in some parts more than a foot in depth, while on the north-east part, close to the buoy, there is a portion which dries; this latter is heaped up with an easterly wind. The channel edge is steep, there being 7 and 8 fathoms water immediately off it, but on the north-west side the depth decreases more gradually. To clear it on the south side, bring the Needles lighthouse to bear S.E. by E.  $\frac{1}{2}$  E., and it will lead close to the south-west buoy, and over the Dolphin bank in 4 fathoms: or, by night, keep the white light in sight. On the west side the bank may be cleared by bringing Milford church to bear N.E.  $\frac{1}{4}$  E., when it will appear between the two houses next the shore; this will lead eastward of the Dolphin. On the eastern edge of the bank are the following buoys, each of which is moored in 7 fathoms:—*South-west Shingles*, red and white (chequered); *Elbow*, red and white (vertical stripes); and *North-east Shingles*, red and white (horizontal stripes).

**Trap, North Head, and Mineway Shoals.**—The first of these is a small spit



of sand and gravel thrown up at Hurst point; it is steep, so that vessels hugging the point to avoid the tide should give it a fair berth. The second is a gravel bank of 9 feet water on the southern side of the North channel, and narrowing the passage to a third of a mile in breadth; it lies with Milford church N.  $\frac{1}{4}$  E., and the extremes of Hurst and Sconce points in one. And the third lies a third of a mile from the beach with Milford church about N.E., and carries a depth of from 9 to 11 feet.

The **Dolphin** is a bank of chalk rocks, the eastern end of which, 4 fathoms, lies  $1\frac{3}{4}$  miles N.W. from the Needles lighthouse. It extends W.  $\frac{3}{4}$  N. and E.  $\frac{3}{4}$  S. nearly 2 miles, and is about a quarter of a mile broad, with a depth on it of  $3\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, except close to its east end, where it is not more than 18 feet. Close to it on the north side are 9 to 11 fathoms water, and on the south side 6 to 7 fathoms. To sail *between it and the Shingles*, bring Milford church to bear N.E.  $\frac{1}{4}$  E.; and to clear it on the *south* side, bring the Needles lighthouse to bear S.E. by E.  $\frac{1}{2}$  E., or during night keep the white light in sight.

**DIRECTIONS FOR THE SOLENT.**—Vessels may run into the Solent channel either northward or southward of the Shingles shoal; the former passage (the North channel) is, however, intricate, and has not more than  $3\frac{1}{2}$  fathoms water in it; the South or Needles channel is, therefore, more generally used.

**North Channel.**—When approaching this channel the mark to lead between Christchurch ledge and the Dolphin bank in 11 to 9 fathoms, is Egypt point in one with Hurst castle, bearing nearly E.  $\frac{1}{4}$  S., which course may be followed until Milford church bears N.E.  $\frac{1}{4}$  E., and is seen between the two houses next the shore, when steer up in that direction until Hurst low light appears nearly in one with the south end of West hill trees, about S.E. by E.  $\frac{3}{4}$  E., as it is the mark for clearing the west side of the Shingles. The latter mark will carry through the North channel in not less than 17 feet water, and with it a vessel may run pretty close to the beach, which is steep, altering the course as necessary to keep about half-way between the Shingles N.E. buoy and Hurst point; with the flood a ship will be quickly carried past the point, but care must be taken to keep outside the eddy off the Trap, already described.

It would be useless to attempt the North channel against the ebb, unless with a strong leading wind, or in a steam-vessel.

**Needles or South Channel.**—When approaching from westward, steer in with Nodes beacon in line with the junction of the red and white variegated cliffs in Alum bay, E. by S.  $\frac{3}{4}$  S., or the Needles lighthouse E.S.E.; these marks will lead just without the southern side of the Dolphin bank, and near the Bridge reef and the S.W. Shingles buoy. Having passed southward of the S.W. Shingles buoy, bring the leading mark on, viz., the south end of Hill trees just south of Warden point, bearing about E.  $\frac{1}{2}$  N.; this will lead in 5 fathoms between the Shingles and Bridge reef. When within and north-eastward of the S.W. buoy an E.N.E. course will lead up the Needles channel. The eastern side of the Shingles is well marked by the buoys, so that there should be no difficulty in avoiding it, care being taken to keep eastward of their line of direction. Strangers should carefully avoid opening Nodes beacon northward of the Needles lighthouse before getting the leading mark for the entrance of the channel on.

No vessel should on any account attempt this channel, unless under the care of experienced management. With the flood the Shingles is the safe side. Do not attempt to cross the Bridge reef eastward of the bearing of the south end of Hill trees open of the rocks of Hatherwood point. Continue with the leading mark on until Hurst lighthouses are in one. As the Elbow buoy is approached keep the high

lighthouse open its breadth eastward of the low one, remembering that the Needles lighthouse must not be brought westward of S.W. by W., until the whole of the fort on Sconce point is open northward of Round Tower point. When eastward of the Warden and How ledges borrow towards the island shore to avoid the eddies off Hurst point. After passing Sconce point, select an anchoring berth off Yarmouth, or proceed eastward.

With a smooth sea, vessels of moderate draught may cross the Bridge reef with Hurst lighthouses in line by day and the lights in line by night, bearing N.E. by E.  $\frac{1}{2}$  E.; but if drawing 19 or even 18 feet these marks should not be used at low water springs, as they would lead too close to the shoal water on the reef. When well within the reef, or when the Needles lighthouse bears S.E.  $\frac{1}{2}$  E.; or is in one with Sun Corner, edge a little to the northward, if the tide is flowing, to avoid being set too close to the island shore.

Although the lead should on no account be neglected, it will be of little service, for the tide hustles a vessel so quickly through the channel that the seaman has scarcely time to avail himself of any warning it might afford; but a marked attention to the soundings is of the utmost importance when approaching the entrance from sea.

*At night* approach the channel with Hurst high light bearing E.N.E., and take care not to go so far northward as to lose sight of the white light at the Needles, or the vessel will strike on the tail of the Shingles. When the Needles light bears E. by S.  $\frac{1}{2}$  S., steer E.  $\frac{1}{4}$  S., until Hurst high light comes a little open eastward of the low light, when steer in that direction, as that mark will carry clear of the buoy marking the elbow of the Shingles. Some care is necessary to avoid the influence of the eddy tide on the flood off Hurst point, and the indraught of the North channel on the ebb.

When approaching this channel great attention should be paid to the soundings. Strangers should never make for the entrance unless the Hurst lights are in sight. When the depths are under 10 or 11 fathoms you may be assured that you are approaching the entrance; but with the light northward of N.E. by E. this depth will be found very close to the Needles rocks. Great caution must therefore be used when approaching the Bridge reef, until the lights are eastward of that bearing, having the anchor ready to let go at a moment's warning.

*Sailing Outwards.*—With due attention to the preceding directions, there can be no difficulty in sailing outward by this channel, except that in turning out upon an ebb tide, when in the vicinity of the elbow of the Shingles, and standing westward, the high lighthouse must not be brought within its apparent breadth to the east side of the low lighthouse. Perhaps it would be advisable, after getting abreast Hurst beach, to throw the vessel's head towards the island, and drop her out with the tide. Due care must of course be taken to keep well eastward of the buoys of the Shingles, as the edge of that bank is steep.

*Tides.*—It is high water at the Needles on the days of full and change at 9 $\frac{3}{4}$ h. The western or ebb stream makes at 10h., and the flood or eastern stream at 3h. 40m. The velocity of both streams over the bridge and in the South channel is from 3 to 4 knots; between Hurst point and Round Tower point, 5 $\frac{1}{2}$  knots; and southward of the bridge, about 2 knots.

Just outside the Needles rocks, and off Sun corner, the flood runs S.E.  $\frac{1}{2}$  E., 11 $\frac{1}{2}$  knots. In the South channel there is no indraught on the flood, except near the rocks; it runs directly through in the fairway between the S.W. buoy and the extremity of Bridge reef, towards the Needles rocks, but about halfway between the outer-

most of the latter and the tail of the Shingles, it turns more eastward. It then runs smartly along the island shore, over the Tinker and Warden ledges. Near the edge of the Shingles, on the northern side of the South channel, the flood sets right off the shoal before it turns north-eastward. The velocity being less on the Shingles side of the channel, until it unites with the flood through the North channel, the danger lies on the island side, which should be particularly guarded against.

It is high water at Hurst point on the days of full and change at 10h., and again at 12h., and low water at 3h. 37m.; springs rise  $7\frac{1}{2}$  and neaps 5 feet. The western or ebb stream makes at 10h., and the flood or eastern stream at 3h. 40m. The flood sets fairly through the North channel and joins the South channel flood about two cables southward of Hurst point. There is a strong eddy running down between the meeting of the tides and the point, which must be carefully avoided, for a vessel in it would become totally unmanageable. At the western entrance the flood runs at the rate of from 3 to  $3\frac{1}{2}$  knots at springs, and 2 at neaps, but off Put-off point, the elbow in Hurst beach, to the eastward, it increases to a race, running at springs with a velocity of at least 5 knots.

The ebb splits about one-third of the way between Hurst point and Cliff-end, one part running through the North channel and the other setting across the South channel and over the Shingles, between the N.E. and Elbow buoys, with considerable velocity. That portion which runs through the North channel sweeps gradually, but with great force, round Hurst point, causing a strong counter tide inshore. Like the flood, it follows the deep water course of the channel, and sweeps round Christchurch bay, diminishing in rate as the narrows are past. Off Hurst point, the rate with springs is about 4 knots, and with neaps 3 knots, and westward of Put-off point from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  knots.

At the back, or north-westward of the Shingles, the direction of the flood is from E. by S. to S.E.  $\frac{1}{2}$  E. setting across that shoal; its velocity at one mile from it is about  $2\frac{1}{2}$  knots. The direction of the ebb is from N.W. by W. to W. by N., and the rate from 1 to  $1\frac{1}{2}$  knots. The stream turns eastward about one hour before low water by the shore.

As before observed, the ebb splits about one-third the distance over from Hurst point to Cliff-end, one part running through the North channel, and the other setting obliquely across the South channel, and over the Shingles between the N.E. and Elbow buoys. On account of the indraught of the North channel, which will be felt anywhere between Sconce point and Warden ledge, it is advisable with light winds on an ebb tide, to keep well over on the island shore, until abreast the Warden buoy. Between this buoy and Hatherwood point, in mid-channel, the tide takes the course of the deep water. Abreast the point the influence of the outset at the entrance begins to be felt, and in calm weather would carry the vessel safely through between the S.W. Shingles buoy and Bridge reef. The ebb sets strongly over the Bridge about W.S.W., but gradually trends westward, at half a mile from the reef, where its direction, which is the fair tide, is W. by N.  $\frac{1}{2}$  N., running  $1\frac{1}{2}$  knots with springs.

**CHRISTCHURCH BAY and HARBOUR.**—From Hurst point the coast runs north-westward about 6 miles, and then turns south-westward 2 miles to Christchurch head, being everywhere low, especially in the vicinity of Hurst point, where it is raised but little above the sea. In the bay formed by this trend of the coast there is good anchorage about  $1\frac{1}{2}$  or 2 miles from the shore, in depths of 3 to 6 fathoms, shelter from the south-westward being afforded by Christchurch ledge, which serves to break the force of heavy seas from that quarter.



The entrance to Christchurch harbour lies N.W. by N.  $6\frac{1}{2}$  miles from the Needles lighthouse, and is nearly choked by drift sand. The bar is dry at low tide. On the days of full and change it is high water here at 9h., and again at  $11\frac{1}{2}$ h.; the rise at the town is 3, and outside the bar 7 feet. None but the smallest vessels can enter.

**Christchurch Ledge.**—The ledge running off from Christchurch head extends about  $2\frac{3}{4}$  miles S.S.E.  $\frac{3}{4}$  E., the depths on it varying from 3 feet to 3 fathoms. It is extremely dangerous, as its southern edge is steep, with 6 to 8 fathoms water immediately off, so that it ought not to be approached, although small vessels may cross it in  $2\frac{1}{2}$  fathoms by bringing a clump of trees on a distant hill open west of Highcliff trees, N. by E.  $\frac{1}{2}$  E.; but this requires local knowledge. A black buoy is placed on the ledge in 3 fathoms, but it must be remembered that only  $2\frac{3}{4}$  fathoms will be found on the end of the ledge, at twice that distance from the shore.

To go *eastward* of the ledge, bring the Priory church at Christchurch well open eastward of Christchurch head, bearing N.N.W.  $\frac{1}{2}$  W.; and *westward* of it, the same church open west of the head, bearing N. by W.  $\frac{1}{4}$  W., will lead clear of it until about half a mile from the shore. Vessels northward of the ledge will go clear of Christchurch bar, and the foul ground without it, by bringing Old Harry or Standfast point well open of Christchurch head.

The anchorage off Christchurch is in 3 fathoms, sand and mud, with the Priory church in one with Sandhills house, bearing about N.W. by W.

**POOLE BAY.**—From Christchurch head the coast bends round westward to Poole head, a distance of  $6\frac{3}{4}$  miles. About 5 miles westward of Christchurch head is Bournemouth, a popular watering-place; the coast between may be approached to within half a mile, there being no outlying dangers, but in the north-west part of the bay, between Bournemouth and Poole head, are several small patches of 18 to 8 feet water within  $1\frac{1}{2}$  miles of the shore; of these the three outer, named *Outer Poole*, *Middle Poole patches*, and *Bournemouth rocks*, have 13 to 18 feet water on them, and 6 to 7 fathoms close-to. Vessels may clear them on the *south* side by bringing Poole low light N.W. by W.  $\frac{1}{2}$  W., and on the *east* side Bournemouth church N.N.E.  $\frac{1}{2}$  N. The two inner patches of 8 feet lie within half a mile of the shore; the easternmost, named Durlly rock, at one-third of a mile south from Little Durlly chine, and the westernmost, named Inner Poole patch, at half a mile S. by E.  $\frac{1}{2}$  E. from the coastguard station on Poole head.

**POOLE.**—The bar of Poole harbour lies nearly 13 miles W.N.W. from the Needles point, and has on it generally from 6 to 8 feet at low water; but this depth is by no means certain, as it frequently shifts, on which account no stranger ought to attempt to cross it without a pilot. At high water springs there are about  $14\frac{1}{2}$ , and with neaps 11 feet on it. The channel inwards is pointed out by buoys, and within the entrance there is anchorage for vessels in the various branches of the harbour, where the depths at low water vary from 10 to 40 feet. Pilots are usually taken on board in Studland bay. A heavy sea is caused by southerly and easterly winds, which breaks violently over the bar.

**Tides.**—Poole harbour has the advantage of the tide ebbing and flowing twice in 12 hours; it is low water at 3h. 50m.; it then flows regularly 5 hours and 20 minutes, and makes proper high water at about 8h. 50m.; it then ebbs about  $1\frac{1}{2}$  hours, and again flows  $1\frac{1}{2}$  hours, and then ebbs again until low water. The second flood seems to be owing to the situation of the mouth of the river. By its being in a bay towards the east, the tide of ebb, from between the Isle of Wight and the main, falls into the bay, and forces its way into the river, so as to raise the water for an hour and a half;

at which period the water without the bar, by its falling below the level of that within, produces a second ebb for the space of three hours, or until it is high water. The rise on springs at Brownsea island is about  $6\frac{1}{2}$ , and on neaps 3 feet; the same on the bar.

**Lights.**—On the south part of North Haven point, at the entrance to the harbour, are two *fixed* white lights on lamp posts, bearing N.  $\frac{1}{3}$  W. and S.  $\frac{1}{3}$  E. from each other, distant 262 yards apart. The northernmost or high light is 37 feet, and the low light 16 feet above high water, and both are visible in clear weather from a distance of 6 miles. The low light is masked between the bearings of N. by E.  $\frac{1}{4}$  E. and N.  $\frac{1}{3}$  E.

There are four more *fixed* lights within the entrance; viz., a white light on North Haven point, a white light near Lilliput farm, and two *red* lights at the town.

**Studland Bay.**—Studland bay, between Poole bar and Foreland point, affords shelter from westerly winds. The anchorage is in 4 to 6 fathoms with Durlston head between Standfast point and Old Harry, which mark also leads eastward of Poole bar. Small vessels may lie further in and be better sheltered, if south-easterly gales come on. The banks within are soft mud.

**Swanage Bay.**—Swanage bay lies between Standfast point and Peverel point, the latter bearing from the former S.W., distant  $2\frac{1}{4}$  miles. Here is very indifferent anchorage, the bottom being in many places foul, though it is much used by vessels detained by south-westerly winds. The mark for the best ground is the south side of a round hummock a little northward of Swanage, on with the windmill farther up from the shores, in 4 or 3 fathoms.

A pier 273 yards long and 18 feet wide runs out in an easterly direction from Swanage, and has on it two 5-ton cranes, with which vessels lying alongside are loaded with Purbeck stone, which is shipped in large quantities. At the end of the pier is a depth of 18 feet at high water springs.

The shores of Swanage bay rise with a gradual slope from the sea, and at the north point is the east end of the chalk range that extends across the country from Whitenore to Ballard down, where it terminates in white cliffs, which reappear again at the Needles.

A rocky ledge extending a considerable distance eastward from Peverel point, is marked at its extremity by a *black* buoy.

From Peverel point to Durlston head the bearing and distance are S.W.  $\frac{1}{2}$  S., nearly a mile, and from the Needles point to Durlston head, W.  $\frac{1}{3}$  N.  $14\frac{1}{2}$  miles.

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## SOUTH COAST OF THE ISLE OF WIGHT.

The south coast of the Isle of Wight is high, and visible from a considerable distance at sea, particularly its most southern portion; the hills over St. Catherine point being 800 feet high, are distinctly seen in clear weather at the distance of 25 or 30 miles. At the white chalky coast forming Culver cliff the land is high, Bembridge down over it being 312 feet above the sea; it then decreases in height in a south-westerly direction, until at Dunnose it suddenly rises to the height of 760 feet, and this high land is continued as far as St. Catherine point, when it again decreases in elevation as far as the Needles point, the white chalky cliffs of which render it very conspicuous when contrasted with the dark-coloured land behind it. In sailing along, many remarkable and interesting objects will be seen, among which may be mentioned Sandown castle, Shanklin chine,

Bonchurch, Ventnor, St. Catherine lighthouse, Blackgang chine, and the Needles point.

The shoals, channels, &c., eastward of Culver cliff have already been described. The coast of Sandown bay westward of Culver cliff, between it and Dunnose, is clear beyond the distance of one-third of a mile, while at three-quarters of a mile from the shore there is a depth of 7 fathoms, which gradually increases seaward, until at the distance of 2 miles it is 10 and 11 fathoms. Sandown castle is on the shore side, at nearly 2 miles from Culver cliff, and has near it the village of Sandown. The village of Shanklin, with the remarkable break in the cliffs known as Shanklin chine, is  $1\frac{1}{2}$  miles more to the south-westward, in the direction of Dunnose. At the foot of Dunnose a rocky ledge runs off a short distance, close to the edge of which the depth is 7 fathoms, so that it will be advisable not to approach too near. The overfalls off Dunnose are not dangerous except in bad weather, when no boats should attempt to pass through them.

At Dunnose is the village of Bonchurch, and a mile further on that of Ventnor. From Dunnose to St. Catherine point the distance is about 5 miles, and the coast is high and rocky, having at its base a dangerous ledge formed by the falling of the cliffs. On the outer edge of this rocky ledge, near Dunnose, are the Church and Ventnor rocks, which are nearly a quarter of a mile from the shore, and have immediately outside them 4 fathoms, and a little further out 9 fathoms water. This rocky ledge in general does not extend far from the land, so that by keeping half a mile from the coast all danger will be avoided.

**ST. CATHERINE LIGHT.**—St. Catherine point, the southern extremity of the Isle of Wight, is a low rounded point at the foot of St. Catherine hill, and the stone lighthouse marking the point, stands out boldly when viewed from eastward or westward. The hill, which is the highest part of the island, rises to the height of 804 feet above high water, about a mile northward of the point, and on its summit are the remains of an old lighthouse, and an old tower.

At a short distance from the base of the point, a third of a mile westward of the lighthouse, is a dangerous rock named the Jeremy, which has  $2\frac{1}{2}$  to 3 fathoms close to it, deepening rapidly to 6 and 8, and then suddenly to 11 and 15 fathoms; this latter depth is at about three-quarters of a mile from the land.

The lighthouse on St. Catherine point is an octagonal stone castellated building 122 feet high, and from it at an elevation of 178 feet above high water is exhibited a *fixed* light, visible in clear weather about 19 miles.\*

**The Coast.**—The overfalls of St. Catherine point, like those of Dunnose, are partly caused by the various sudden transitions from deep to comparatively shoal water. They are, however, not dangerous, except in bad weather, when no open boat should attempt to pass through. The Race of St. Catherine varies in proportion as the wind is with or against the tide. In gales of wind from the westward, and during spring tides, the sea breaks S.E. of St. Catherine point as violently as in the Race of Portland.

From St. Catherine point to the Needles point the distance is  $12\frac{1}{2}$  miles, and no vessel ought to approach the coast closely, because of the dangerous ledges which extend from it. On the west side of St. Catherine point are some patches of  $2\frac{1}{2}$  to  $4\frac{3}{4}$  fathoms, the outermost being half a mile from the shore, with 11 fathoms close-to;

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\* In foggy weather a fog horn is sounded at St. Catherine lighthouse. The mouth of the horn is 81 feet above high water, and traverses an arc of  $215^\circ$  (E.  $\frac{3}{4}$  S. southward to N.W.), and points in every direction between those bearings once in each minute. The duration of the sound is five seconds, and the interval is 15 seconds between each blast.



there is also a rock of 4 fathoms, named the Chale rock, lying three-quarters of a mile west from Blackgang chine, having another patch of  $4\frac{1}{2}$  fathoms between it and the shore. Another, named St. Andrew's rock, of  $4\frac{1}{2}$  fathoms, lies half a mile north of the Chale at three-quarters of a mile from the shore, with Blackgang chine bearing S.E. by E.  $\frac{3}{4}$  E.; between it and the land there are 8 to 5 fathoms, and immediately outside is 9 to 14 fathoms, which depth also exists close to the Chale rock. At Atherfields point, 3 miles from St. Catherine point, some rocks extend a short distance from the shore, and have off them some patches of 3 fathoms; the latter lying about half a mile from the land, and having 5 and 6 fathoms close to them. Hence, northward, the coast for a distance of 5 miles is bordered with rocks, which extend out more or less about half a mile, and have 2 fathoms close to their edge, deepening rapidly to 4 and 6 fathoms. At about 9 miles from St. Catherine point, the chalk cliffs begin, and the coast then turns westward to the Needles point, forming Freshwater bay, in which the soundings at a mile from the land are 8 to 9 fathoms. Opposite Nodes beacon there is a small patch of 4 fathoms, one-third of a mile off shore.

Between St. Catherine and Durlston heads the depth averages 18 to 13 fathoms, and in sailing along an indraught, setting in with the flood toward the Needles passage, must be properly allowed for. The Needles light is described on page 50.

**DIRECTIONS.**—Between the Needles and St. Catherine point the shore must be approached with caution, particularly on the flood, as that stream sets directly towards the many treacherous ledges stretching out a considerable distance, particularly those off Brook and Atherfield points. The highest of the chalk cliffs on the east side of Freshwater bay on with Brook point N.N.W., or a remarkable white road running over the down in line with Blackwood point, will lead outside the Ship and Atherfield ledges, and also of the St. Andrew and Chale rocks to the south-east. A safe mark for small vessels working up in-shore is, to keep the three Needles rocks open of Sun Corner, or the Priory church at Christchurch open of the Needles lighthouse, N.W. by N.; with the Needles lighthouse only open of Sun Corner, a vessel would run upon the Atherfield ledges. At night a vessel of large draught should on no account lose sight of the Needles *red* light, which will be on a N.W.  $\frac{1}{2}$  N. bearing, nor stand into a less depth than 15 or 16 fathoms at low water.

A good precaution is to keep the Needles light N.W. by N. until St. Catherine light bears N.E., when a vessel may safely haul to the eastward until the Nab light is sighted, the bearing of which will be a guide for clearing the Princessa shoal and for the eastern entrance to Spithead.

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#### POOLE BAY TO START POINT.

From Durlston head to St. Alban's head the distance is about 4 miles. The overfalls off St. Alban's head are chiefly caused by the unevenness of the ground, and vary considerably, as they are sometimes found more westerly, and sometimes more easterly, according as the wind and tide act in concert or against each other. There is not less water to be found in their vicinity than 6 fathoms, with 12 and 15 fathoms on both sides, as well as southward.

On the west side of St. Alban's head is a small cove, named Chapman's pool, in which small coasting vessels during easterly winds sometimes stop a tide, but the anchorage is not safe. Hence a rocky ledge, known as the Kimmeridge ledge, runs along the coast about  $4\frac{1}{2}$  miles; the depth close off them is 5 to 10 fathoms, but they

may be cleared by keeping St. Alban's head eastward of S.E. by E., or Arishmill Gap (known by its white sandy beach), open of Worbarrow head (which has a conical hill on its summit), bearing N.W. by N.

From Chapman's pool, following the coast north-westward, are the several coves of Kimmeridge, Worbarrow, and Lulworth, in which very small craft sometimes obtain shelter. The latter is the best place, as it is closed to all but south-westerly winds. From Worbarrow head nearly to Ringsted point, 7 miles to the north-westward, the coast is generally bold, but there are a few outlying rocks at a short distance off the shore. Off Ringsted point a ledge runs out a third of a mile, and has on its outer end only 10 feet water. Thence to Weymouth the distance is about 3 miles, and the shore has several rocky ledges running from it.

**WEYMOUTH ROAD AND HARBOUR.**—In Weymouth road there is good anchorage in from 5 to 8 fathoms at half or three-quarters of a mile E.S.E.-ward from the jetty head. The bottom is of sand and gravel. Vessels should not anchor within three-quarters of a mile of the northern shore of the road, as there is foul ground there. There is very little tide here, so that the stream is scarcely perceptible.

The entrance to Weymouth harbour is behind Portland island and breakwater, about  $14\frac{1}{2}$  miles N.W. by W.  $\frac{1}{2}$  W. from St. Alban's head. It is a very convenient little place for vessels not drawing more than 10 feet, as these may lie moored alongside the quays, and be almost always afloat, excepting at low water spring-tides, when, though they will touch the ground, no damage will ensue, it being soft mud. The depth in the entrance with springs is 16, and with neaps  $14\frac{1}{2}$  feet at high tide, but within the harbour there are only about 7 feet at low, and 14 feet at high-water spring-tides. It is high tide (full and change) at 6h. 56m.; springs rise 7, and neaps  $4\frac{1}{2}$  feet.

On the south side of the entrance is a pier; from the extremity of which a breakwater of loose stones runs out about 370 feet, the outer end being marked by a buoy. On the north side of the entrance there is a jetty; the channel between is narrow, and requires some care. At about a ship's length from the shore, near the pier, is a shoal of sunken rocks, named the Mixen, which will be avoided by keeping in 4 or 5 fathoms; or, keep St. John's church (at the north end of Melcombe Regis) well open eastward of the beacon on the breakwater at Weymouth, bearing N.  $\frac{3}{4}$  W. The flood runs 4 hours in and 4 hours out, and it is slack water 4 hours.

*Lights.*—Near the beach, eastward of the railway station, are two *fixed red* lights, 30 feet and 20 feet above high water, and bearing from each other N.N.W. and S.S.E. On the north pier of Weymouth harbour are two *fixed green* lights, 20 feet high, bearing E.  $\frac{3}{4}$  N., and W.  $\frac{3}{4}$  S. of each other.

Approaching Weymouth harbour, keep St. John's church (at the north end of Melcombe Regis) open eastward of the pile beacon, bearing N.  $\frac{3}{4}$  W. to clear the Mixen rocks, which run off nearly a cable eastward from Nothe point; these and the rocks extending about 180 feet from the north-east point of the Nothe to the beacon, are the only dangers to avoid in entering the harbour. Give the buoy a berth of about 200 feet in rounding, on its eastern side, and keep in mid-channel until the vessel is abreast the outer south quay. She will then be within the northern jetty and past the rocks running out from the Nothe, after which the deepest water is on the south side of the harbour.

At night, after passing Portland breakwater, bring the two red lights at Weymouth in line N.N.W., and keep them on until the two green lights on Weymouth north pier are in line W.  $\frac{3}{4}$  S.; this latter mark leads in through the deepest water until close to

the north pier lights, which may be passed close-to, after which a mid-channel course up the harbour should be preserved.

**PORTLAND BILL** is easily recognised, being very lofty, and sloping towards the north. It is about  $3\frac{1}{2}$  miles long and  $1\frac{1}{2}$  miles wide, and extends out from the main-land nearly 6 miles, being connected with the shore by a pebbly beach, which divides Portland road from West bay. In its highest part the island is 488 feet above the level of the sea.

The Bill of Portland may be closely approached, as there are 3 to 4 fathoms water at two cables off, on the south-east side, which is the shoalest; but by keeping outside the depth of 5 fathoms all danger will be avoided. It is considered prudent not to approach the land nearer than 30 or 27 fathoms in thick weather, or during the night.

On the extreme south-western part of Portland Bill is an obelisk, 20 feet high, with its summit 60 feet above high water, which has been erected in consequence of the altered appearance of the Bill, arising from the excavations of the quarrymen. When the top of this tower is brought in one with the upper lighthouse, the Bill extends to seaward exactly 90 fathoms from the said tower.

**Lights.**—The two lighthouses near the south end of Portland are 50 and 85 feet in height, and 503 yards apart. They each exhibit a *fixed* light, and when in one bearing N.N.W.  $\frac{3}{4}$  W. lead between the Race and Shambles. The high light is 210 feet, and the low light 136 feet above high water level, and in clear weather are visible from the respective distances of 21 and 18 miles. The low light is only visible seaward when bearing between S.E. by E.  $\frac{1}{2}$  E. and W. by S.  $\frac{3}{4}$  S.; on all other bearings it is hidden by the high land.

**Portland Ledge.**—Portland is safe to approach on all sides, but the soundings are irregular, particularly near the Bill, where a remarkable shelf of rock, called Portland ledge, extends a mile in a S.S.W. direction from the pitch of the Bill, terminating in a sharp point. The inner part of the ledge is nearly a mile across, and continues to flank the shore to the south-east for about  $1\frac{1}{2}$  miles.

The soundings over the ledge vary from 3 to 9 fathoms, breaking down suddenly into deep water, on the west side into 20 fathoms, on the south into 18, and on the east side into 13 and 14 fathoms.

At a quarter of a mile from the Bill of Portland there is a depth of 5 fathoms; at a mile distant 10 fathoms; and  $1\frac{1}{2}$  miles off 20 fathoms.

**Race of Portland.**—The tide runs with great violence round the Bill and over the ledge, causing fearful whirls and eddies in its progress; but there is generally an eddy of still water, a quarter of a mile wide, between the Race and the land.

In northerly winds, the Race extends from the Bill nearly 2 miles, and there are great overfalls even beyond that distance; but with southerly winds, it scarcely exceeds half a mile. During the north-eastern stream of tide, the overfall takes place to the eastward, and during the south-western stream to the westward.

During spring tides, which run at the rate of 5 or 6 knots, the agitation is so violent as to render it dangerous for small vessels to pass through the Race; and in tempestuous weather, during the north-eastern stream, the whole space between Portland and the Shambles is one sheet of broken water. The turbulent sea thus created has, in some instances, so alarmed strangers, as to induce them to bear up and run their vessels on shore on Chesil beach; a fatal error, leading in the majority of cases to the loss of ship and crew. In fine weather even, the noise caused by the Race may be heard a considerable distance.

The Race has been well described in a small work on Portland roads, published by



Messrs. Bowen and Block, of Portland, in 1852, in the following manner:—“The Race is composed of breakers, or whirl tides, the cause of which cannot easily be explained. The flood sets 9 hours eastward, and the ebb only sets 3 hours westward, thereby causing the flood-tide from the West bay to come in contact with the Channel ebb-tide, outside Portland Bill; and this circumstance may contribute greatly to these breakers, although this cannot be the only cause, as when there is not this contention between the tides, and the ebb alone is running, the breakers are still to be seen, though their velocity is not so great. It is also (and far more reasonably) ascribed to a sunken reef of rocks, which runs about a mile out in a southerly direction from Portland Bill. On this reef the water is of different depths, varying from 5 to 18 fathoms, and is remarkably steep on both sides, so that the changes from deep to shallow water are there very sudden.

When the north-east flood tide runs, the Race is eastward of this reef; and when the south-west ebb-tide runs, it is westward of the same, clearly showing that the reef, if it does not entirely create it, nevertheless has something to do with it. The distance between the two places where the Race is to be found is about a mile. The Race extends eastward and westward about 2 miles, its breadth is about half a mile, and it lies generally S.S.W. from Portland Bill. We say generally, because one of its singularities is, that although its bearings remain the same, yet it is not always the same distance from the land. With northerly winds it is about 2 miles from Portland Bill, or sometimes more; and with southerly winds the distance is only 6 or 7 cables, or half a mile. At spring tide and a heavy sea, when the north-east flood-tide runs, it is very dangerous, especially for vessels deeply laden. If it should happen that a vessel cannot clear the Race, the best to be done under such circumstances is to carry on a great press of canvas, so as to get out of this position as soon as possible, taking good care to batten down the hatches, as heavy breakers cannot be avoided.

In a gale of wind, or any other circumstances, it is almost certain destruction to anchor outside, with the object of getting clear of the Race, as the bottom is so bad that it affords no holdfast, and the vessel would drive directly into the Race, without there being the least hope of any surviving to tell the tale.

**SHAMBLES.**—The Shambles is a dangerous bank of coarse sand, gravel, and broken shells, the western end of which,—assuming the depth of 10 fathoms for its limits,—bears from the Bill of Portland S.E.  $\frac{1}{2}$  E.  $2\frac{1}{4}$  miles; and thence its direction is E.  $\frac{1}{2}$  S.  $2\frac{1}{2}$  miles, with an average width of two-thirds of a mile. The depths on this bank are irregular, as there are several shoal heads with only from 11 to 18 feet on them, and 5 to 7 fathoms between. The least water, 11 feet, is near the middle of the shoal, from which St. George's church is in line with the south side of Church cove, N.N.W.  $\frac{1}{4}$  W.

The position of the Shambles is clearly shown, except at slack water, by a ripple or overfall on the north or on the south side according as it may be flood or ebb. On the south side the bank rises suddenly from the depth of 10 fathoms into shallow and numerous heads with 5 to 2 fathoms water over them. The approach on the north side is more gradual; but as there are occasional shoal patches, it would not be safe for a vessel of large draught to stand into less than 10 fathoms. The bank should on no account be crossed by vessels drawing more than 10 feet, and then only in fine weather. Blowing hard, the sea breaks furiously over it, and instances are known of small vessels foundering on it.

The mark to clear the west end of the Shambles, between it and the Race, in 8 fathoms, is St. George's church open a quarter of a point westward of Portland windmills

N.  $\frac{1}{4}$  W.; if brought in one with the mills it leads *over* the west end of the shoal in 26 feet. Another, and a better mark to clear the west end of the shoal is the light-houses at Portland in one, bearing N.N.W.  $\frac{3}{4}$  W. To clear the *east* end of the shoal, at the distance of about 6 cables, bring Wyke Regis church open of the low north-eastern point of Portland, N.N.W.  $\frac{1}{4}$  W.;—or bring Wyke Regis church in one with the low point of Portland, N.N.W., as that will lead at a safe distance from the shoal in 9 fathoms.

To go clear of the Shambles on the *north* side, bring Anvil point just open of St. Alban's head, E.  $\frac{3}{4}$  S., as that mark will lead about half a mile from the shoal in 13 and 14 fathoms; and on the *south* side bring Anvil point open  $3^{\circ}$  west of St. Alban's head, the head will then bear northward of East.

Between the Shambles and Portland there is a good channel with plenty of water. An excellent mark to run between the Race and the shoal is the small chalk-pit (westward of the White Horse on Osmington downs), over the eastern point of Portland, bearing N.N.E.

As Portland lights afford no guide at night for sailing vessels outside the Shambles, no vessel should approach it within the depth of 30 fathoms.

The tide at full and change sets over the shoal from 3 to 4 knots in an E. by N., and W. by S. direction, making to the eastward at 3h. 15m., and to the westward at 10h. 45m.

The **Shambles Lightvessel**, moored off the east end of the shoal in 15 fathoms at low water, exhibits at 38 feet above the sea a *fixed* light, visible about 10 miles. A gong is sounded in foggy weather, and a gun is fired if a vessel is seen standing into danger. From it Belfield house (in the trees westward of Weymouth) appears between the piers of Portland breakwater, bearing N.N.W.  $\frac{1}{6}$  W.; and Portland low lighthouse N.W. by W.  $\frac{3}{4}$  W.

**PORTLAND ROAD.**—In Portland road there is excellent anchorage on firm solid blue clay, good shelter being afforded from all directions. No pilot is needed when running in, for if the Shambles (described hereafter) be cleared, there is no danger to bring a vessel up, so that in thick blowing weather there is frequently a large fleet of ships of all sizes riding at anchor behind the magnificent breakwater. When entering, pass either eastward or westward of the Shambles, according to convenience, then steer so as to pass round the north end of the breakwater, whereon there is a small *red* light at night, and take up an anchorage where suitable.

The breakwater is a splendid stone structure about  $1\frac{2}{3}$  miles in length, extending first in an easterly direction from the north-east end of Portland island, and then N.N.E.-ward towards Redcliffe point, thus enclosing a harbour of refuge above  $1\frac{1}{2}$  miles in extent, with from 5 to 10 fathoms water in it, having an entrance  $1\frac{1}{2}$  miles wide and free from dangers, so that strangers are enabled to run in and anchor with ease and security, being sheltered from southerly, south-easterly, and E.S.E.-ly gales, the only winds which formerly rendered Portland road dangerous.

Portland road or Harbour of Refuge offers many advantages to seamen, independent of the shelter afforded by the breakwater. There is little or no tide, so that ships are scarcely ever tide-ridden, besides which vessels are able to leave at any hour of day or night, there being no occasion to wait for high water, as in many other ports, nor for a fair wind, as there is ample room to beat in or out. The bottom is very hard, so that in anchoring with a fresh westerly breeze it is necessary to pay out a large scope of chain, it being difficult to get a holdfast if the anchor once begins to drag. On leaving the roads, and bound eastward, it is recommended, while the

south-west ebb-tide is running in the English Channel, not to do so before the tide slackens, unless there is a good stiff breeze and a fair wind, as the spring ebb-tide running  $6\frac{1}{2}$  knots would be likely to carry the vessel on to the Shambles or into the Race.

*Tides*.—It is high tide at the breakwater (full and change) at 7h. 1m.; springs rise 6ft. 9in., and neaps 4ft. 2in., neaps range 2ft. 3in.

*Directions*.—Approaching Portland, and wishing to pass eastward of the Shambles, the lightvessel will of course be the best guide, but if from any cause it should not be in position, then Wyke Regis church open of the low north-east point of Portland, N.N.W.  $\frac{1}{4}$  W., clears the east end of the Shambles. This church is on a hill a little westward of Weymouth, and its tower has somewhat the appearance of that of an old castle; it is also to be recognised by its flat roof, as well as by being the only high building between Weymouth and Portland. When Portland Bill bears W. by N. the Shambles will be passed, and a course may be steered for the north end of the breakwater.

The channel between the Bill of Portland and the Shambles should never be attempted by a sailing vessel without a commanding breeze. The leading mark between the Race and the Shoal is, the small chalk-pit—to the westward of the white horse on Osmington down—in line with Grove (the eastern) point of Portland bearing N.N.E.: but as the chalk-pit is a distant object, and not always sufficiently distinct to be identified, an equally good mark is the north end of Portland breakwater just open of Grove point, on the same line of bearing. In coming from the westward, keep in shore immediately Portland ledge is passed, as the eastern stream sets direct from the Bill for the Shambles.

Vessels bound to the westward with a westerly wind, may, while the eastern stream is running, turn to windward nearly up to the Bill by keeping near the eastern shore of Portland; but in all probability if they attempt to round the Bill before the tide slacks they will be swept off shore and carried through the Race. Coasters can approach this shore to a cable's length in not less than 3 fathoms water; vessels of large draught should not approach nearer than a quarter of a mile.

Between the Race and the Bill there is a useful channel, 3 to 9 fathoms deep which is frequently used by small vessels, particularly with a leading wind. If intending to run through from West bay, weigh with the last of the ebb, and steer for the high lighthouse, keeping the Bill rather open on the starboard bow, with which precaution, as the vessel nears the shore, the tide will sweep her round the point and within the Race; but to shape a course for the Bill, in order to give it a berth, she would be caught in the strong tide. With a beating wind, work close up along the land, as it is bold to a cable's length.

Although this passage is frequently used by small vessels, it should be borne in mind that there is a strong eddy tide or 9 hours set on the eastern side of Portland, running in a different direction to the one out of West bay. If, therefore, the vessel is so late in the tide as not to be able to get round Grove point before the fourth hour of flood, she had better anchor, to prevent being carried back again into the West bay tide, or endeavour to get off shore to the eastward into the fair flood stream.

*At night* the leading mark between the Shambles and the Bill is the two lights in one, N.N.W.  $\frac{3}{4}$  W., until the fixed red light on the breakwater bears N. by E.  $\frac{3}{4}$  E., when steer for it, taking care to keep a safe offing on approaching Grove point, and a prudent distance when passing the breakwater. During the eastern stream the higher light should be kept open to the westward of the lower one, as that stream



sets with great velocity over the Shambles; and as the western stream sets as strongly into the Race, similar precautionary measures should be taken not to be set to the westward.

**WEST BAY.**—West bay, on the west side of Portland island, is deep, there being 16 fathoms water at a mile from the beach, thence shoaling to the shore, close to which is a depth of 7 and 8 fathoms. The bottom is coarse loose gravel or shingle, and vessels at anchor are sheltered from S.S.E. eastward to N. by E.; but are exposed to all other directions. When strong winds are blowing from south-westward, Portland roadstead should be run for by vessels in the offing. The shore of the bay is known as Chesil beach, and here vessels used frequently to be run ashore, the idea prevalent with seamen some time since being, that if so embayed as not to be able to get round Portland Bill, and the wind and sea so high as to render coming to anchor impracticable, the best course, especially at the beginning of the ebb-tide, was to run ashore (with all sail), under the belief that after remaining on board until a few heavy seas had forced the ship well upon the beach, and fixed her pretty fast, they might, during the interval between two seas, get on shore with safety; but experience has afforded convincing proofs of the danger of this experiment, it having, in several instances, proved fatal.

There is no place of refuge in West bay, it is consequently recommended, when beating to windward between Portland and the Start, not to enter the bay too far (it is better not to approach it at all during winter), because a strong S.S.W. gale suddenly springing up may prevent the vessel getting round Portland Bill or into Torbay; and if shipwreck occurs in a heavy sea, the most fatal consequences are to be apprehended. The usual place of anchorage is about a third of a mile from the shore off the south end of Chesilton, with Portland high light in one with Blacknor point, S.S.W., as the depth is 8 or 9 fathoms on clay.

*Tides.*—At Chesilton it is high water (full and change) at 6h. 13m.; in the middle of West bay,  $1\frac{1}{4}$  miles from shore, the stream turns S.E.-ward at  $1\frac{3}{4}$ h. and N.W.-ward  $10\frac{3}{4}$ h., setting 9 hours out of the 12 towards Portland Bill, at a rate of 2 knots, which rate increases rapidly as the Bill is approached.

Captain MARTIN WHITE, R.N., says, "The greatest foresight is necessary, when using this anchorage in winter, to provide against sudden shifts of wind, as those which blow strongly from westward and southward send in a very heavy turbulent sea, against which few anchors can hold, or few vessels beat with any prospect of success; for although the tide sweeps strongly along the cliffs southward, yet the influence thereof is too closely confined to the shore to produce any advantageous effect on vessels striving to get an offing. It is, however, possible, between the periods of half-flood and half-ebb, to work out of the anchorage with the wind at all southward of S.S.W. by compass, and from half-ebb to half-flood the attempt might succeed, provided the wind was in any degree northward of W.N.W. by compass, but I would not advise too much reliance to be placed even on this alternative: a vessel is, on all occasions, much safer at sea than in West bay."

If in West bay, and a strong gale springs up from the S.S.W., so as unfortunately to prevent a vessel getting out of it, it seems to be the best course, if a small ship, to endeavour to make Bridport harbour (16 miles N.N.W.-ward of the Bill), and there obtain shelter, if possible; if, however, it be found impracticable to enter the harbour, as a last resource, the vessel might be run aground on the beach close to the eastern side of the piers, as it consists of soft mud.

**BRIDPORT.**—Bridport harbour is formed by two wooden piers parallel to each

other in a N.E.  $\frac{1}{4}$  N. direction and about 230 yards long; they are 50 feet apart, but the channel-way is not more than 40 feet wide. Within the piers is a secure basin capable of accommodating about thirty vessels. On the days of full and change it is high water at 6h. 5m.; springs rise  $12\frac{1}{2}$  feet, and neaps 9 feet. With high spring tides the depth over the bar is 14 feet, and with neaps 10 feet; and within the harbour at the same time 16 and 12 feet respectively.

A buoy is or was moored in  $2\frac{3}{4}$  fathoms, sandy ground, 260 yards W. by S.  $\frac{3}{4}$  S. from the outermost pier; and W. by S., about three-quarters of a mile from the point of the same pier, is the Pollock, a rocky shoal of 11 feet water. The *High ground* about three-quarters of a mile from the Pollock, and W.N.W.  $\frac{1}{2}$  W., about  $1\frac{1}{4}$  miles from the pier, is half a mile from the shore, and has over it only 9 feet water. The highest land in the vicinity of Bridport is a hill close to the shore, 3 miles north-westward from the harbour. Under it a vessel in distress may run on shore at a place called Seaton beach, at one hour ebb; by staying on board a quarter of an hour, the crew may reach the shore, and save their lives.

Vessels from westward can pass southward of the High ground and Pollock by bringing Puncknol's Knoll (a small conical hill with a house on its summit) in one with the low east end of the last cliff eastward of Bridport harbour, bearing S.E. by E.  $\frac{1}{4}$  E.; and when Bridport church is in line with the piers can steer direct for them,—this latter mark leads eastward of the Pollock. The buoy outside the piers will assist in warping a vessel in or out. It is usual to shoot between the piers, and be hauled into the harbour by men. The best anchorage outside the harbour is in 3 or 4 fathoms abreast the piers, about a quarter of a mile off, over a bottom of fine sand. During southerly gales the sea breaks so heavily at the entrance, that no ship should attempt to approach it; small vessels at such times find secure shelter at Lyme Regis.

**LYME REGIS.**—Lyme Regis is  $7\frac{1}{3}$  leagues N.W. by N. from Portland Bill, and  $6\frac{1}{2}$  miles from Bridport. It is a small pier-harbour, dry at low tide, but at high water springs 9 to 12 feet deep, and with neaps 6 to 9 feet deep. The Cobb or pier, a substantial stone structure, shelters small vessels within it from south-westerly gales; whilst the inner pier and north wall protect it from the swell caused by gales from south-eastward. The bed of the harbour being of hard marl with only a surface coating of a few inches of mud, vessels occasionally strike heavily on taking the ground, particularly when a heavy sea outside causes a run within the pier. From the Cobb end, in the same line as the Cobb, there is a sharp point of loose stones, the outer end of which is marked by a beacon. A lifeboat is stationed here.

*Lights.*—From half-flood to half-ebb a *fixed red* light is shown on the inner pier-head of Lyme Regis, and another light, also *red*, at the custom-house; they are 275 yards apart in a N.W.  $\frac{1}{2}$  N. and S.E.  $\frac{1}{2}$  S. direction. The light at the pier-head is 11 feet, and the other light 21 feet above high water, and both may be seen in clear weather from a distance of 4 miles.

*Tides.*—It is high water (full and change) at Lyme Regis at 6h. 21m.; springs rise  $11\frac{1}{2}$  feet, and neaps  $8\frac{1}{2}$  feet. At a mile southward of the harbour the stream makes to the eastward at 4 P.M., and to the westward at 10 A.M.; its greatest rate is only a knot, with an interval of slack water.

*Directions.*—At night, the high red light kept a little open eastward of the low red light, N.W.  $\frac{1}{2}$  N., will clear the outer Cobb end, and lead to the inner pier-heads. During day, steer for the beacon (on the extreme end of the reef projecting from the outer pier-head) and give it a berth of 20 or 30 yards in passing. In strong southerly winds, when the sea breaks heavily round the piers, the proper place for a wrecked

crew to take the beach is at the back or eastern side of the north wall, where the boat would most probably be driven.

**Beer Road.**—Nearly 6 miles westward of Lyme Regis is Beer head, a lofty and precipitous chalk cliff, 426 feet high, the westernmost in England. About  $1\frac{1}{2}$  miles eastward of this headland the little river Axe enters the sea; upon its banks are the villages of Axmouth\* and Seaton, at its entrance is a small pier and landing quay, and over the bar at high spring tides is usually a depth of 11 or 12 feet. Beer roadstead, on the eastern side of the head, affords but very confined anchorage, with shelter from northerly winds; the best position is in 5 fathoms water, sandy bottom, with Beer village N. by W.  $\frac{3}{4}$  W., and the extremity of the head W.  $\frac{3}{4}$  S.

**Sidmouth.**—Nearly  $4\frac{1}{2}$  miles further to the westward is Sidmouth, an open place with a fine shingly beach, and good landing from half-flood; at low water it is all shoal. The entrance of the river Sid is choked by an accumulation of shingle.

**Budleigh Salterton,** lies  $4\frac{1}{2}$  miles W.S.W. from Sidmouth, and is a village with a fine beach, at the east part of which is a river choked at its entrance, but frequented by small craft at high water, which lie sheltered from easterly winds by Otterton head.

A detached rock with only 2 feet water over it, lies about half a mile S.E. by S. from Budleigh Salterton chapel, and may be cleared on its west side by bringing the obelisk in Bickton park in one with the coastguard watch-house at Budleigh Salterton. A rocky ledge also extends nearly a third of a mile from Otterton head in a S.W.  $\frac{1}{4}$  W. direction, the greater part of which is dry until about half-flood; it may be cleared in 3 fathoms on its eastern side by keeping Sidmouth church open a quarter of a point of the land eastward of Otterton point. It may here be observed that all the rocky ledges between Beer head and Straight point, the eastern point of the mouth of the Exe, will be avoided by keeping half a mile off shore.

**EXMOUTH.**—The entrance to Exmouth harbour lies 12 leagues N.W. by W.  $\frac{1}{4}$  W. from the Bill of Portland, and  $12\frac{1}{2}$  miles N.E.  $\frac{1}{2}$  N. from Berry head.

\* Off the village of Axmouth there was formerly a roadstead for shipping, but on December 25th, 1839, a convulsion occurred which changed the character of the coast and depth of water near it.

"This convulsion commenced at 3h. A.M. of the 24th December, and continued during the whole of Christmas Day, with a roaring noise, accompanied by a perceptible motion of the earth at some distance from the place of disturbance. A tract extending east and west, about a mile in length, and several hundred feet in breadth, subsided or sunk, and formed a chasm more than 200 feet deep. Columnar masses, resembling vast pinnacles or towers of chalk, have been left standing in places, whilst the more broken or crushed parts have sunk around them; immense banks of flint and broken rock have risen in hillocks on every side, whilst the ground is rent and scored in seams many feet wide and deep.

"The chasm thus formed was not the whole effect of the phenomenon, nor was it the most extraordinary; it lies parallel to the shore, and has cut off from the mainland a portion of the seaboard, about a mile in length, and half that in breadth; this mass was forced on its foundation many yards in a southerly direction towards the sea, inclined somewhat from its former level, and rent and depressed into terraces. But the most singular effect was produced on the bed of the sea, the whole of which, in front of this disarranged portion of land, was lifted 40 feet above the surface to a great distance out from the original line of coast, and now consists of reefs and islands (where none previously existed) within which are bays and coves containing deep water. These reefs of thrown-up rocks are covered with marine productions, such as corallines, fuci, and shells. The western basin, thus singularly originating, somewhat resembles the Cobb at Lyme, but has this advantage over it, that it is larger in size; the eastern basin is entered through a long narrow channel, which then widens into what may be termed a salt lake or lagoon." *Newspaper Report of the Period.*)



The approach to it is between the Warren, a long sandy point on the western side, which extends  $1\frac{1}{2}$  miles from Langstone point, and Orcomb point on the eastern side, which is about 60 or 70 feet above high water. The Warren is covered with coarse grass, and abounds with rabbits. The channel is very narrow, with a long shallow bar of broken water, bounded on its north side by a fringe of dangerous rocks uncovering only at low water, and on the south-west side by far-spreading treacherous sands.

A fairway buoy (striped *black* and *white* horizontally, and carrying a beacon) is moored in 6 fathoms water, a mile outside the entrance. The channel is indicated by buoys, black on the eastern side, and striped black and white on the western. A life-boat is stationed here.

A floating dock 530 feet long and 30 feet broad has lately been opened at Exmouth, and opening from it is a dry dock (in course of construction) 250 feet long by 58 feet in breadth.

The canal to Exeter commences a mile below Topsham, and is 5 miles long, 13 feet deep, and 30 feet wide; it terminates in a lock and basin,—the lock is 120 feet long, and 28 feet wide, the basin (opposite the quay at Exeter) is 917 feet long, 18 feet deep, and from 90 to 110 feet wide. Vessels must lighten to 12 feet before they can enter the canal. At Topsham there is a dry dock, 190 feet long, 42 feet wide, 32 feet between gates, and 10 feet deep over the sill at high-water springs, and 7 feet at high-water neaps. A steam tug is available.

Exmouth harbour is difficult of access, and unapproachable in a heavy sea; consequently, it should not on any account be depended upon as a safe refuge to make for in stormy weather.

*Tides.*—In Exmouth harbour it is high water (full and change) at 6h. 21m.; springs rise  $12\frac{1}{4}$  feet, and neaps  $8\frac{1}{2}$  feet. At low water the depth over the bar is only 5 feet, at high water springs 17 feet, and at neaps 14 feet.

The flood at the entrance makes soon after low water, setting fairly over the bar and up the channel (until the banks are covered) at a rate of from 1 to  $2\frac{1}{2}$  knots abreast the church. The ebb at first sets across the Warren and Pole sands, over the former at a velocity of  $2\frac{1}{2}$  knots, which decreases to about 1 knot over the latter. The sands are uncovered at  $2\frac{1}{2}$  hours ebb, and then the stream sets fairly through the channel at about the same rate as upon the flood-tide. Outside the bar the stream (full and change) turns eastward at  $3\frac{3}{4}$ h., and westward at 11h., continuing in the latter direction  $4\frac{3}{4}$  hours.

**Directions.**—*Approaching Exmouth harbour from southward*, bring Exmouth church to bear N.N.W.  $\frac{1}{2}$  W., or in line with the south-east house on Beacon hill, and it will lead to the fairway buoy.

The entrance should not be attempted without a pilot, but with a leading wind, if compelled to do so, leave all the black buoys on the starboard and the striped black and white buoys on the port hand; the channel is winding, and under any circumstances as little as 5 feet at low water must in all probability be crossed. The atmospheric engine chimney at Starcross (a tall and conspicuous red tower) in line with Exmouth point, bearing N.N.W.  $\frac{3}{4}$  W., will lead westward of the first striped black and white buoy on the Pole sand, and up to the anchorage off the town.

*Approaching the harbour from westward*, after rounding Clerk point and a remarkable rock outside it known as the Clerk, keep Exmouth church well open of Warren point, N.E. by E., to pass eastward of the Dawlish (a rock 11 feet under water). Abreast Clerk point, at half a mile off shore, the fairway buoy bears E. by N., when it will be in line with Straight point, and distant 4 miles. Between Clerk and Lang-

stone points, the low-water rocks dry more than a cable off shore, and there is a gradually shelving bank outside them.

A good turning mark up to the fairway buoy is, to keep the whole of the town of Exmouth open of Warren point, and not to open Mamhead tower northward of Langstone point, which precaution will avoid the Pole and Shallow flat sands westward of it; but the soundings are regular, and attention to the lead (allowing for the rise or fall of tide) will always afford sufficient warning.

*Entering from eastward* steer for Straight point (which may be rounded with safety at a quarter of a mile), then keep Mamhead tower in line with the houses at Mount Pleasant (which rises a little to the northward of Langstone point) bearing about W. by N.  $\frac{1}{2}$  N. This, although a close mark, is a safe one with a fair wind for clearing the ledges between Straight and Orcomb points, and also leads well inside the fairway buoy, and up to the fairway mark for entering the harbour.

As the entrance of this harbour is not lighted (1870), it cannot be run for with safety at night.

**TEIGNMOUTH.**—Teignmouth lies N.W. by W.  $\frac{3}{4}$  W. 39 miles from Portland Bill; W. by S.  $5\frac{1}{2}$  miles from the fairway buoy at Exmouth harbour; and N. by E.  $\frac{3}{4}$  E.,  $8\frac{1}{2}$  miles from Berry head. It is a small harbour, with a bar which has but a foot of water upon it at low spring tides, while within the harbour at the same time is a depth of 7 to 15 feet. On the days of full and change it is high water at 6 hours; springs rise 13 and neaps 11 feet.

As the bar of the river Teign changes frequently no leading marks can be given that can be depended upon. Vessels can anchor anywhere outside the bar, according to draught of water, but it must be borne in mind that the shoal water runs a long way out, and that it is extremely dangerous to be surprised by a southerly gale, especially if unable to take the bar, which, even with sufficient water, would then be attended with difficulty and danger. A lifeboat is stationed on the Denn.

*Lights.*—A *fixed red* light (visible about 6 miles) is shown from a tower on the south-west end of the Denn, at the northern side of the entrance. A small shifting light, also of *red* colour, is placed in one of the houses behind the lighthouse, and the two in line lead clear of the rocks off the Ness (the southern point of the entrance) as well as of the highest part of the East Pole sand, on the north-eastern side.

From Teignmouth Light to Hope Nose, on the northern side of Torbay, the bearing and distance are S. by W.  $\frac{1}{2}$  W.  $4\frac{1}{2}$  miles. Babbacombe bay,  $1\frac{1}{2}$  miles northward of Hope Nose, affords good anchorage in from 4 to 5 fathoms, sandy bottom, sheltered from westerly winds.

**TOR BAY.**—Tor bay lies between Hope Nose and Berry head, two points bearing from each other N.N.E. and S.S.W. distant  $3\frac{2}{3}$  miles; thence it runs in about 3 miles, and is 8 to 6 fathoms deep, gradually decreasing to the shore. Southward and westward of Hope Nose are some small islands or rocks; the outermost is known as the *Ore-Stone*; the next, the *Loadstone* or *Flat* rock, lies close to the point,—there is a passage  $5\frac{1}{2}$  to 9 fathoms deep between this rock and the *Mew-stone*; the next is the *Thatcher*, and the westernmost are the *East* and *West Shag*. The last mentioned rocks are about one mile westward of the point, and lie within  $1\frac{1}{2}$  cables of the shore; at about the same distance ( $1\frac{1}{2}$  cables) S.E. from the East Shag is *Morris Rogue*, a rock with 4 feet over it, and 2 and  $5\frac{1}{2}$  fathoms water immediately outside. Berry head is about 180 feet in height, steep to, and nearly

vertical; it is composed of limestone, has a flat summit, and may be seen at the distance of 20 miles.

Tor bay is open to eastward, and south-easterly gales send in a heavy sea, but there is shelter from all winds from N.E. northerly to S. by W., and even to S.S.E. if a berth be taken up close in to the south-western shore. The whole of the bay affords good anchorage over mud and clay, but there is a patch of foul ground small in extent, with  $3\frac{1}{4}$  fathoms water on it, in its south-western corner, nearly midway between Paignton and Brixham harbours, and about half a mile from the shore.

The Ore-stone, its own breadth open of the Thatcher, E.  $\frac{1}{2}$  S., and the whole of Torquay pier visible, is the mark for anchoring in Torquay roads, in the northern part of the bay. The anchorage usually preferred is Brixham roads, with Brixham church about S.W., and Berry head S.S.E.; here large ships should not anchor farther southward than to have Paignton church on with Roundham point, N.W.  $\frac{3}{4}$  N., nor farther westward than the high part of the Thatcher over the narrow neck of Hope Nose, N.E.  $\frac{1}{4}$  N.—at this anchorage they will be sufficiently to seaward to secure an offing, in the event of a south-east gale springing up. Should a vessel part from her cables, and be obliged to run on shore, the best place for so doing is in Elbury cove, in the south-west corner of the bay, where there is a beach sheltered by rocks.

*Directions.*—When entering Tor bay from northward, vessels may keep close to the Ore-stone, if necessary. If passing between the Ore-stone and Flat rock, keep about mid-channel, and do not approach too near the west side of the Ore-stone, for on that side the water is shoal half a cable from the rock; there is also a rock lying about half a cable S.W. from the Ore-stone. The Ore-stone, its own length open of the Thatcher, E.  $\frac{1}{2}$  S., will lead clear of the foul ground, and all the shoals on the northern side of the bay.

If entering from southward, Berry head may be rounded at any convenient distance, being steep. The south shore is clean and the depths regular, but it will be necessary to keep clear of a reef which runs a short distance from Shoalstone point; this reef is about half a mile eastward of Brixham harbour, and about equidistant from it and the extremity of Berry head.

**Torquay.**—Torquay is a small pier-harbour in the northern part of Tor bay. The entrance between the piers is 145 feet wide, and the depth 11 feet with high neaps, and 14 feet with high spring tides. The harbour contains an area of about 7 acres, and is dry at low water, but at high springs is 10 to 14 feet deep, and with high neaps 7 to 11 feet. On full and change days it is high water at 6 hours. A *red fixed* light (visible 5 miles) is shown from the pier-head, 15 feet above the sea.

**Paignton**, a small pier-harbour at the head of Tor bay, is equidistant from Hope Nose and Berry head. The entrance is 145 feet wide, and its area is only 4 acres; the depth within is from 8 to 10 feet with springs, and from 7 to 9 feet with neaps. It is high water 10 minutes later than at Torquay; springs rising  $14\frac{1}{2}$ , and neaps  $11\frac{3}{4}$  feet.

**Brixham.**—Brixham pier-harbour is about a mile within Berry head, on the southern side of Tor bay. It is high tide here (full and change) at 6h. 18m.; springs rise  $13\frac{1}{2}$  feet, and neaps about 10 feet. The depth in the harbour with the former tides is 10 to 15 feet; at the entrance, which is 163 feet wide, there are at such times 20 and 17 feet water. A *red fixed* light (shown from an iron stand on the pier-head at 20 feet above the water) is visible at the distance of 6 miles. A breakwater is being built about  $2\frac{1}{2}$  cables eastward of the piers:



it now (1870) extends 250 yards from the shore, and affords shelter to small vessels.

**Coast Dangers.**—Between Berry head and Mewstone islet, near Dartmouth harbour, are the Cod rocks, Mudstone ledge, the Nimble, Bootfield, and East Blackstone rocks. The *Cod* rocks, two in number, lie about a third of a mile S.S.W. from Berry head; they are 40 and 50 feet high respectively, and are connected by a reef covered at high water,—there is no navigable channel between them and the shore. The *Mudstone* ledge is distant one mile S.S.W.  $\frac{1}{2}$  W. from the pitch of Berry head, and 4 cables from the shore of Sharkham point; it has  $4\frac{1}{4}$  fathoms least water over it, and there are from 5 to 9 fathoms in the Narrow passage between it and the Mag rock and ledge extending from the point. The dangerous sunken rock named the *Nimble* has only  $3\frac{1}{2}$  feet over it at low water; it lies southward of Down-end point, a third of a mile from shore, with Start lighthouse on with the East Blackstone. The *Bootfield*, which carries a depth of 9 feet, is situated 340 yards from shore, off the south-east extremity of Down-end point. And the *East Blackstone*, a rock about 10 feet high, bears from Down-end point S.W. by S., distant one mile. By keeping Hope Nose open of Berry head, N.N.E.  $\frac{1}{4}$  E., all these dangers will be cleared.

**DARTMOUTH.**—The entrance to Dartmouth harbour is 5 miles S.W. by W. from Berry head, and 7 miles N.E.  $\frac{1}{2}$  E. from Start point. The depth in mid-channel at low water decreases gradually from 10 to 5 fathoms in the Range, then increases again to 11 and 12 fathoms just within St. Petrox castle, and afterwards shoals in the river to abreast the town, where it varies from 10 to  $3\frac{1}{2}$  fathoms. It is high water at Dartmouth (full and change) at 6h. 16m. Springs rise 14 feet 10 inches, and neaps 11 feet 2 inches.

Dartmouth harbour is well adapted for the reception of trading vessels; but the entrance is narrow, and the opening does not readily unfold itself to vessels approaching from southward; the square steeple, however, of Stoke Fleming church, upon the land south-westward of the harbour's mouth, serves to mark its position nearly, until by a closer approach Kingswear Old castle and St. Petrox church become visible. St. Petrox church and castle are on the western side of the entrance, just within Battery point: and on the rocks near the water's edge, on the opposite side, is the Old castle of Kingswear, consisting of a single square tower.\*

The outlying dangers when making Dartmouth are few, and by those acquainted with the harbour not difficult to avoid. The coast east and west of it is very steep and precipitous, and presents a most uninviting appearance in rough, boisterous weather, so that it should not be trifled with; there not being for miles a yard of shingle or sand upon which a vessel compelled to be run aground could be safely beached.

**Lights.**—A lighthouse on the northern or Kingswear side of the entrance to the harbour exhibits a *fixed* light at 85 feet above the sea, visible 11 miles. This light shows *white over the fairway* entrance, through an arc of  $9\frac{1}{2}^{\circ}$ , or from S.  $\frac{3}{8}$  E. to S. by E.  $\frac{1}{4}$  E.; is *red* from S. by E.  $\frac{1}{4}$  E. to the shore, and *green* from S.  $\frac{3}{8}$  E. to the shore. A white light is also shown from a flagstaff at the distance of 110 feet seaward from the above light. The lights in one, bearing N.  $\frac{3}{4}$  W., lead into the harbour.

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\* In order to distinguish the entrance of Dartmouth better than is done by the steeple of Stoke Fleming church, a beacon of grey granite has been erected on the high land at nearly half a mile N.E. by N. from the outer Froward point, on the east side of the entrance to the harbour. This beacon is 80 feet high, and in the form of a pyramid.

Having arrived at the narrow part of the entrance to the harbour by the aid of the above-mentioned lights, a smaller white light, near the coast-guard station at the southern part of the town of Dartmouth, indicates the fairway to the anchorage. This light shows *red* over the shoals on the north side of the harbour, and *green* over the shoal of One Gun point on the south side of the entrance.

**Dangers off the Eastern shore.**—These consist of Mewstone and Shooter islets, and the rocks named Verticals, Bear's Tail, and Old Castle. There is also a rock known as the Kettle, just under the Kettle point, opposite St. Petrox church.

**Mewstone.**—The Mewstone is 125 feet high, and distant from the coast about  $1\frac{1}{2}$  cables; it is steep on the eastern side, and near its south-western side is a depth of 6 to 10 fathoms. A rocky ledge surrounds it for a short distance, and there are rocks between it and the shore, so that although there is a passage 13 to 17 feet deep, no vessel should attempt to run through; if circumstances, however, compel the attempt being made, keep in mid-channel as nearly as possible, and look out carefully for the rocky heads.

**Shooter.**—This is 76 feet high, and distant about 500 feet westward from the Mewstone. It may be considered as connected with that islet, there being a ledge of rocks between, which becomes covered at the first quarter flood.

**Verticals.**—These are distant from the Mewstone about  $1\frac{1}{2}$  cables in a W.  $\frac{1}{2}$  N. direction, and are so named from their steep and precipitous sides. They become dry at the last quarter-ebb, and have immediately around them 5 and 8 fathoms water. Some rocks lie between them and the Mewstone, so that although there is a narrow passage, peculiar circumstances alone justify an attempt to make use of it.

**West Rock.**—The West Rock is a small rocky patch dry at very low tides. It is distant about  $2\frac{1}{2}$  cables in a W.  $\frac{1}{2}$  N. direction from the Mewstone, and lies with the extremity of Outer Froward point bearing N.N.W., nearly a quarter of a mile. It is very dangerous, because close to it, on the south side, the depth is  $4\frac{1}{2}$  to 10 fathoms, and on the north side  $4\frac{1}{2}$  to 8 fathoms. To clear it on the west side, bring Kingswear castle open of Inner Froward extreme point N.N.W.; and on the south side, the south point of the Mewstone E.  $\frac{1}{2}$  S. It should be marked by a buoy.

It will be prudent to give the West Rock a wide berth, because other dangers may be in its vicinity. There is a shoal patch of 4 fathoms at a cable from its west side, and another of  $3\frac{1}{2}$  fathoms 350 feet from it in a north-westerly direction. The flood-tide sets on it.

All the above rocks lie pretty well in a direct line parallel with the coast, and as they have deep water at a very short distance from their south side, the lead is but a very uncertain guide in approaching. A good mark to clear all danger is the East Blackstone well open of the point of the Mewstone, and bearing E.  $\frac{1}{4}$  N.

**Bear's Tail.**—This is a small rock, dry at low tide, lying about 400 feet southward of Outer Froward point, and connected with that point by a flat of 17 to 10 feet water. Close to it the depth is 6 and 5 fathoms. Its marks are Kettle and Inner Froward points in one, and the highest peak of the Mewstone on with the highest peak of the Shooter.

**Old Castle Rock.**—This is the shallowest of several shoal spots lying in a S.W. by S. direction from Inner Froward point. It has but 4 feet water upon it at low tide, and from it the old castle at Dartmouth (at the southern end of the town) appears just to touch Battery point. To sail within this rock, and across the 15-foot spit connecting it with the shore, bring Beacon hill in one with Kingswear

castle, bearing N.N.W.; the same mark also clears the Verticals and Bear's Tail rocks.

*Castle Ledge.*—The other shoal spots immediately around the Old Castle rock are three in number, and have upon them respectively 8, 16, and 8 feet water at low tide. The outer of these (an 8-foot rock, known as the Castle ledge) lies with the peak of the Mewstone in one with the right tangent of the Shooter, and may be cleared on the south side by bringing the same peak open of that islet. To clear it on the west side, bring the flagstaff at the castle in one with Mount Boone house; or Battery and Kingswear points touching N. by W.  $\frac{3}{4}$  W., which mark also leads in the fairway to the harbour as far as Battery point.

As some guide to vessels, and with the object of enabling them to avoid the Castle ledge and rock, a *black* buoy is moored in 5 fathoms at about half a cable outside the ledge. Its marks are St. Petrox church in one with the centre of a grove on the back land, N.N.W., and a conspicuous double-point rock off Combe point in one with a house on Slapton beach, W.  $\frac{1}{2}$  S.

*Kettle Rock.*—This is a small shoal, dry at low tide, just inside Kettle point, opposite St. Petrox church. Near it there are two patches of 5 and 3 feet, almost close to the land.

**Dangers off the Western shore.**—The coast immediately westward of Dartmouth harbour is very steep, and has various rocky dangers off it, named respectively Combe, Homestone, Pin, Mag or Mica, Blackstone, and Checkstone. These, with the exception of the Homestone and Pin, are at a more or less moderate distance from the shore, and may easily be avoided if proper caution be exercised.

*Combe Rocks.*—These consist of a cluster of rocks (above and under water) surrounding Combe point. The outer rock is distant rather more than a cable from the shore, and is dry at half-tide; close to it on all sides except the western, the depth is 5 and 6 fathoms, so that with moderate care and a good look-out it may be approached, particularly as the near proximity of the Old Combe rock (always above water, and distant from it only 275 feet in a W.N.W. direction) renders its position easy to be recognised. It will not be prudent, of course, to approach it except at low tide, when it is above the surface.

At about 400 feet N.E. by N. from the Outer Combe rock, and about half a cable from the shore, is an isolated rock, dry at low water. The depth in its immediate vicinity is 5 and 6 fathoms, and it may be cleared on the east side with all the Combe rocks by bringing Kingswear castle to bear N.E.  $\frac{1}{4}$  N., and open of Blackstone point.

*Homestone Rocks.*—The Homestone consists of a rocky ledge of 14 to 16 feet (upon which are two shoal spots of  $4\frac{1}{2}$  and 6 feet), lying a quarter of a mile E.S.E. from Combe point, and 4 cables S.W. by S. from the Blackstone rock. It is not more than 300 feet in extent, but its situation, being nearly in the fairway to the harbour, makes it very dangerous, especially as there is deep water close to it all round; it has therefore been marked by a buoy painted *black* and *white* in rings. The marks for the shoalest spot ( $4\frac{1}{4}$  feet) are Kingswear castle in one with the Blackstone rock, N.E. by N.; and a high and remarkable needle rock at Combe point in one with Stoke Fleming church, nearly N.W. by W.  $\frac{1}{2}$  W.

Between the Homestone and Combe point there is a clear channel 7 to 5 fathoms deep, which may be used with advantage, particularly with scant westerly winds. To clear the Homestone on the south side, the mark is the south point of the Mewstone in one with the East Blackstone, E.  $\frac{1}{4}$  S.; but this mark leads directly over the Pin rock.



A small shoal of 17 feet has been discovered 127 yards eastward of the Homestone, and about half a cable N.E. by N. from the buoy. To clear it, as well as the Homestone, on the east side, bring St. Petrox church open of Blackstone point, N. by E.

*Pin Rock*, about half a cable in length, lies a third of a mile eastward from Homestone rocks, with Blackstone rock and point in a line. The least water on the rock is  $4\frac{3}{4}$  fathoms, so that it can only be deemed a danger to vessels of large draught, or when a heavy sea is running. The depth close to and around it is 7 to 10 fathoms.

In a line between Pin and Blackstone rocks, and a quarter of a mile from the latter, is a small rocky patch of 25 feet water.

*Mag Rocks*.—These consist of a group of rocks about  $1\frac{1}{2}$  cables to the N.E. of Combe point. They become dry at low tide, and may be cleared on the east side by bringing Kingswear castle open of Blackstone point, N.E.  $\frac{1}{4}$  N. Between them and the coast is a channel deep enough for small vessels, there being a depth of 18 to 20 feet, but it is considered very imprudent to attempt the passage, especially as there is nothing to gain by so doing.

Nearly a cable N.N.E. from the Mag rocks, and a third of a cable from the shore, there is a small rock which dries at spring-tides. Close to it are 3 and 4 fathoms water.

*Blackstone*.—This is a large rugged rock, 8 feet above the surface at high tide, distant about a cable S. by E.  $\frac{1}{2}$  E. from Blackstone point. It must be carefully approached on the eastern side, because a sunken rock lies 70 or 80 feet from it, close to which is a depth of 17 and 20 feet.

The channel between the Blackstone and Blackstone point may be occasionally used by small vessels, but it is not recommended. In nearly mid-channel a small patch of 5 feet will bring vessels up if care be not exercised, and there are also rocks about Blackstone point, so that, although there is sufficient water for vessels of light draught, the passage cannot be considered free from danger. The following is a useful observation to vessels running through:—"Except the rocks off Blackstone point, nothing dries at low water; and as there is a rise of 16 feet, they may at a push use this channel at or near high water, taking care in doing so, to close the rock nearer than the point."

*Checkstone*.—This is the outermost of a group of rocks extending from the shore a little south of Battery point, some of which are under the surface, or only become dry at low-water spring tides. On this, the outermost rock, there is not more than a foot of water; it is consequently very dangerous, and should not be approached nearer than the depth of 6 fathoms, or with Battery and Kingswear points touching, N. by W.  $\frac{3}{4}$  W. In order to mark the rock, a buoy (chequered black and white) has been moored in 10 feet water at a short distance from it, and it is recommended not to approach it too closely, because the depth a little eastward of it is not more than 13 feet.

Just above Battery point, and near the castle, is a small rock awash, but as it is almost close in-shore, it is easily avoided.

*Tides*.—It is high water, full and change, in Dartmouth harbour, at 6h. 16m.; ordinary springs rise 14 feet, and neaps 10 feet. At Dittisham it is high water 6 minutes later than at Dartmouth, and the rise is the same. At Totnes 24 minutes later than at Dartmouth; springs rise  $10\frac{3}{4}$  feet, neaps  $6\frac{1}{2}$  feet. At Blackstone rock and Castle ledge buoy, or anywhere within the Range, the stream turns with the tide on shore, but at the Homestone about  $2\frac{1}{2}$  hours later.

*Directions*.—Dartmouth harbour is difficult to enter, and also to leave, in con-

sequence of the sudden gusts of wind that descend from the high lands with great force. So great is the inconvenience occasioned by these gusts, that Capt. MARTIN WHITE, R.N., says no square-rigged vessel should attempt to enter or leave the harbour except with leading winds.\* These eddy winds are strongest when the wind is westward of N.W., at which time a vessel requires all the attention of a skilful pilot. Those from N.W. and S.E. are the true winds; and, as a general rule, it may be said that in moderate weather, with the wind between N.W. by N. and N.N.E., or S.W. and S.E., a vessel will be found pretty well under command.

The locality of the harbour may be readily recognised at sea by the granite peaks or tors, which break the outline of the Dartmoor range. The most remarkable of these are Hay and Rippon tors; the latter is easily distinguishable from the former by its single culminating point or cairn, while Hay tor, on the contrary, presents a forked or jagged appearance. Rippon tor kept on the bearing of N.  $\frac{1}{2}$  W., leads to the harbour. The Mewstone is also an excellent mark for it. Other marks for it are Stoke Fleming church, with Kingswear Old castle, and St. Petrox church; these have already been mentioned.

The leading mark to the points forming the entrance of the harbour is Battery and Kingswear points touching, N. by W.  $\frac{3}{4}$  W.; or, what is nearly the same thing, the flagstaff on St. Petrox castle in one with Sir Henry Seale's house on Mount Boone. If not able to enter the harbour, anchor in the Range (a roadstead within Blackstone and Inner Froward points) where is good holding-ground, and a depth of 4 to 6 fathoms, with very little tide; this anchorage should, however, only be used as an occasional stopping place preparatory to entering Dartmouth, for southerly winds send in so heavy a sea, that when these prevail there is no alternative but to slip and run into the harbour. The exposure is between E.S.E. southward to S.S.W., and there is generally a strong swell when the weather in the offing is indifferent.

*Approaching from westward*, give a wide berth to the Combe rocks, and steer eastward until past the Homestone, which is marked by a buoy. Having cleared this rock, and the 17-foot shoal near it, steer towards the Blackstone rock, and pass it on the east side, not too closely, however, on account of the sunken rock 80 feet from its eastern point. From the Blackstone steer for the Range, whence the harbour may be entered at convenience.

*Approaching from eastward*, steer from the Mewstone towards Combe point until the leading mark is brought on—viz., Battery and Kingswear points touching N. by W.  $\frac{3}{4}$  W., and be especially careful of the Verticals, West, and other rocks extending in a W.  $\frac{1}{2}$  N. direction from the Mewstone. With the leading mark on, the harbour will be approached clear of all danger; the buoy marking Castle ledge should be passed on its west side.

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\* In the Harbour of Refuge Committee's Report, 1858, it states that, "In the entrance to Dartmouth from westward the Homestone is in the way, and when approaching it from eastward the Ledges must be avoided; but upon these dangers we need only state our conviction that with no great amount of lighting and buoyage, the harbour may be rendered most easy of access to steam vessels by night and by day. There is an abundant depth of water in the channel to and within the harbour of Dartmouth, and from the contracted state of the former, vessels when at anchor in the latter are, in the most comprehensive meaning of the expression, 'landlocked.' The rise of the tide is ample, and the strength of its stream moderate."

We have been informed that the Range is an excellent anchorage, except with leading winds, when vessels can enter the harbour without difficulty; in addition to this a powerful steam-tug is always in the port with her steam up.

Strangers should not attempt to enter the harbour without a pilot; if, however, necessity obliges such to do so, but little risk will be incurred, provided proper attention be paid to the marks. The leading mark at night is the lights in one bearing N.  $\frac{3}{4}$  W.

*Leaving the harbour*, and bound eastward, care is needed in light winds that the flood-tide near Outer Froward point does not set the vessel inside West and Vertical rocks.

From Dartmouth harbour the bearing and distance to Start point lighthouse are S.W.  $\frac{1}{2}$  W., 7 miles; the intervening space, known as Start bay, consists generally of low shore, the country behind which rises gradually.

**START POINT** may be recognised by its rugged, cock's-comb-like appearance, and by the white granite lighthouse, 92 feet high, standing 140 yards inside of its eastern extreme. The five hillocks on the ridge within the lighthouse are each about 200 feet above high water; Peartree head, three-quarters of a mile westward of the point, is 386 feet above that level.

The only dangers in the vicinity of Start point to the south and south-west are, the Peartree, the Start, and Cherrick rocks; the two former are close to the shore; the latter lies S.  $\frac{3}{4}$  W. upwards of two cables from the point, and is awash at low-water springs. A sunken rock, with only 12 feet water over it, lies at the same distance S.E.  $\frac{1}{2}$  S. from the lighthouse, and to avoid it a vessel should not shut in the village of Haulsands with Start point, until Peartree rocks open out south of the Start rocks, when, by giving the latter a berth of about 2 cables, she may proceed to the westward.

There is a considerable rippling off Start point, occasioned by the confluence of the fair-channel tide with the in-shore streams between Start point and Dartmouth and within the Skerries; the former running for equal spaces of time nearly between N.E. and E.N.E., S.W. and W.S.W.; and the latter setting southward for nearly eight hours out of the twelve.

**Light.**—The lighthouse on the Start exhibits, at an elevation of 204 feet above high water, a *revolving* light, which attains its greatest brilliancy every *minute*, and in clear weather should be visible from the distance of 20 miles; within the distance of 10 miles a faint continuous light is seen from the lantern. The light is screened towards the land, and is shown from N.E.  $\frac{1}{2}$  E. eastward and southward to West ( $219\frac{1}{2}^{\circ}$ ).

A *fixed* light is shown from the same tower, at 12 feet below the flashing light, to guide vessels to Dartmouth and Berry head. It is seen only when Start point bears from W.  $\frac{1}{4}$  S. to S.W. by S. By keeping on its western limit, it will lead between the Skerries and the land; its other limit passes over the south end of the Skerries. During foggy weather a bell is sounded.

**SKERRIES BANK.**—The Skerries is an extensive bank of gravel and shells fronting Start bay in an E.N.E. direction from the lighthouse. On its south-west extremity there is a spot of 9 feet water which is distant a mile E.  $\frac{1}{2}$  N. from the point; thence the bank extends N.E. by E. nearly 3 miles, and soundings may be obtained over it of 15 feet to 4 fathoms, with deeper casts between. It is above half a mile across where broadest, and its N.E. end terminates in a coarse sandy knoll of 18 feet water. It is steep, the depth being 11 and 12 fathoms very near outside its S.W. end, 9 fathoms close inside it, and 7 fathoms near the N.E. end.

Widdicombe house in one with the northernmost white house on the Bee sands N. by W.  $\frac{1}{4}$  W., leads between the Skerries and Start point; Berry head in sight eastward of Down-end, N.E.  $\frac{1}{4}$  E. leads eastward of it; Street church on with the



highest part of Street Head cliff, N.N.W.  $\frac{1}{4}$  W. leads northward of it; the Down-end in sight westward of the Mewstone, N.E. by E.  $\frac{1}{2}$  E., leads between it and the land, and Prawl point open of Start point, W.  $\frac{1}{2}$  N., leads southward of it.

Vessels during night, or foggy weather, should not approach the north-east part of the Skerries nearer than into the depth of 17 fathoms, nor towards its south-west end than into 22 fathoms. There is generally a considerable swell of the sea over the bank, and during rough weather the sea breaks very high upon it. If desirous of running westward of it, keep the fixed light in Start point lighthouse S.W.  $\frac{1}{2}$  S., give the northern side of the point a berth of a quarter of a mile, and the south-eastern and southern sides an offing of more than half a mile. With the light bearing N.W. by W.  $\frac{1}{2}$  W., a vessel will be southward of the shoals.

In Start bay vessels may anchor anywhere within the bearings just given for clearing the western side of the Skerries, in from 7 to 8 fathoms, bottom of sand and gravel. They should not, however, anchor within half a mile of Start point, for there the ground is rocky, and the tide sets (9 hours out of the 12) southward, and might carry a weak-handed vessel on shore before she is again fairly under canvas. Here there is shelter, with winds from North, westward to S.W., but if a S.S.W. gale springs up (with which there will be a heavy sea), vessels should run immediately for Dartmouth or Tor bay; in doing which it is necessary to carefully avoid the Earl Stone, a rock 19 feet under water at low tide, lying rather more than half a mile W. by S.  $\frac{1}{2}$  S. from Combe point.

**Start Bank.**—Start bank, 7 miles southward of Start point, is about a mile in length north and south; and though the least known depth over it is 29 fathoms, the sea is much agitated during spring tides.

The soundings off Start point are somewhat irregular; there being from 2 to 3 fathoms more water near the land than in the offing, and farther southward the depth again increases in about the same proportion.

## START POINT TO PLYMOUTH.

**SALCOMBE.**—About  $3\frac{1}{4}$  miles West from Start point is Prawl point; several of the intervening points are fronted with rocks, but none of the rocks advance from the coast so much as to be in the way of vessels bound up or down Channel. From Prawl point to Bolt head the bearing and distance are N.W. by W.  $2\frac{2}{3}$  miles, and between lies the entrance to Salcombe harbour.\*

The bar of Salcombe harbour stretches across the entrance, and has upon it at low spring tides a depth of only 4 feet, but within it as far as the town (though the channel is narrow) is a depth of  $2\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms. Ships of 20 feet draught can cross the bar with a smooth sea, at high water springs, and 16 feet at high water neaps.

To those approaching from south-westward, the harbour shows itself open; the land on the west side of it appears rugged, and that on the east side gradually sloping. On the west side of the entrance is a small island immediately under Bolt head known as the Great or Salcombe Mewstone, south-eastward and south-westward from which to nearly a cable, are rocks over which the sea generally breaks; to these rocks give a

\* On Prawl point a signal staff is erected, for the purpose of reporting by Commercial signals, all passing vessels that make their signal letter.

good berth, passing always to seaward of them. The next point north-eastward of the Mewstone is distinguished by a peculiar shaped rock known as the Eelstone. A small sunken rock, with 9 feet water over it, lies about three-quarters of a mile eastward of the Eelstone; of this it will be necessary to take care when beating into the harbour.

When bound into or out of Salcombe, it is requisite to observe the state of the tide, the draught of the vessel, and strength of the ground-swell generally prevailing upon the bar. At the period of half-flood (the best time to attempt the passage) there will be 6 to 12 feet water on the shoalest part of the bar.

*Tides.*—At Salcombe it is high water (full and change) at 5h. 41m.; springs rise 15 feet, and neaps  $11\frac{1}{2}$  feet. The stream turns at high and low water by the shore, and sets fairly in and out of the harbour; its greatest velocity at springs being  $2\frac{1}{2}$  knots.

*Directions.*—Pilots are generally in attendance at the entrance of Salcombe, and should be employed by strangers. To cross the bar in the deepest water, keep well over on the western shore and steer in with Molt point on with a clump of trees in Northsand bay, and also on with the bend of the turnpike road on the west side of Salcombe hill, bearing N. by E.  $\frac{1}{4}$  E. Immediately the bar is crossed, bring a small thatched summer-house (among trees) on Sandhill point, on with the west side of Charles fort, N.E. by N.; this will lead nearly up to Poundstone rock, and near the beacons. Leave the red beacon on the starboard, and the white beacons on the port hand, and keeping in mid-channel, proceed to the anchorage off the town.

If the beacons be washed away, keep the last mark on until the whole of Southsand bay is open, then bring the thatched summer-house on with the east side of Charles fort, and keep it so until Portlemouth Ferry house is on with the west tangent of Scoble copse, E. by N.  $\frac{3}{4}$  N.; this will lead in the best channel nearly up to Woodville house, after which keep in mid-channel to the anchorage.

There is a channel not less than 4 feet deep at low water springs, eastward of the Wolf and Blackstone rocks; but it is narrow and winding, and should not be attempted by strangers.

**Hamstone and Gregory Rocks.**—These rocks lie N.W. by W. from Bolt head, distant about  $1\frac{1}{4}$  miles, and as they are not more than a third of a mile from the shore, may be cleared by keeping Prawl signal-house open southward of the Little Mewstone.

**Bolt Tail.**—This point lies about  $3\frac{3}{4}$  miles N.W. by N. from the Bolt head. The shore all the way between the Start point and the Bolt tail is very steep and rocky; it ought therefore to be carefully avoided. Indeed, the coast all the way from Start point to Stoke point is foul; but as none of the rocks lie further from the shore than half a mile, a ship of any draught of water may sail within a large half mile of the shore, excepting in Bigbury bay.

**East Rutts.**—This is a patch of sunken rocks (about 2 cables in extent, with  $5\frac{1}{4}$  fathoms water), lying nearly in the fairway of vessels bound to Plymouth from eastward. It is distant from Bolt head N.W. by W.  $\frac{1}{3}$  W.  $7\frac{1}{2}$  miles; S. by E.  $\frac{3}{4}$  E. 7 miles from Plymouth Mewstone; and from the Eddystone E. by S.  $11\frac{1}{4}$  miles. A sudden rise in the land inside Prawl point in one with Bolt head, though distant, is a tolerably good mark for this patch in one direction: no cross mark for it can be given capable of being taken up by a stranger. The peak of the Great Mewstone (Plymouth), however, in one with Maker tower, N.N.W.  $\frac{1}{2}$  W., leads nearly a mile eastward of it, and the peak of the Mewstone in one with Stoke blockhouse and the fall of the land at Renny and Staddon points, N.  $\frac{1}{4}$  W.,

leads 2 miles westward of it. The depth close to it on all sides is 16 to 20 fathoms.

**Stoke Point Rock.**—About 7 miles north-westward from Bolt tail is Stoke point, which is a low peak with a light-coloured base; a third of a mile eastward of the point are two conical stone beacons 6 feet high for pointing out the position of Stoke point rock, which lies S. by E. half a mile from the extreme of Stoke point, and  $3\frac{1}{2}$  cables from the nearest shore, with only 8 feet water on it; but with 11 fathoms close to its south side, and 8 to 4 fathoms between it and the land. The two stone conical beacons on the shore abreast it when in one, bearing N.E. by N., point to the rock; by keeping them open a vessel will pass clear of it on either side; the town of Cawsand open south of the Mewstone, N.W. by N., leads outside it.

**EDDYSTONE LIGHT.**—The Eddystone lighthouse,\* built of granite and 89 feet high, is painted red and white in alternate bands, and stands on a rock awash at ordinary high water springs. It exhibits from an elevation of 72 feet above high water, a *fixed* light, which is visible in clear weather, at the distance of 13 miles. It bears from the Lizard, E.  $\frac{1}{4}$  S.,  $38\frac{1}{2}$  miles; from Rame head S.W.  $\frac{3}{4}$  S.  $8\frac{1}{4}$  miles; and from Bolt head W. by N.  $\frac{3}{4}$  N.  $18\frac{1}{2}$  miles. The S.E. and N.E. sides of the Eddystone are foul to nearly half a mile from the main rock, but the N.W., West, and S.W. sides are perfectly clean within a quarter of a mile, or even less. Between Rame head and the Eddystone the depth is from 20 to 33 fathoms, and westward in the stream of the Eddystone from 29 to 40 fathoms towards the Lizard.

**Hand Deeps.**—This is a bed of sunken rocks, lying N.W.  $\frac{1}{2}$  N., distant  $3\frac{1}{4}$  miles from the Eddystone, upon which is a depth of only 24 feet. The marks for its centre are, Lord Bovingdon's park gateway (the only conspicuous building at this distance from the land that can be conveniently employed) just wholly in view eastward of the high land of Penlee, and the eastern visible part of the Moor hills on with the sharp top of the Great Mewstone. The above-mentioned gateway (which is white, and easily distinguished by an arch in its centre) twice its own apparent breadth open eastward of the lowest part of Penlee point, will lead south-eastward of the shoal.

The lighthouse on Plymouth breakwater in one with Penlee point about E. by N.  $\frac{1}{2}$  N., will lead about a mile N.W. of the Hand Deeps, and if brought in one with Mount Batten, N.E. by E.  $\frac{1}{4}$  E., at about the same distance to the south-eastward.

In bad weather the position of this shoal may be known by the short, turbulent breaking of the sea in its vicinity, and in fine serene weather by the rippling and noise occasioned by the tide. It is very dangerous, and ought to be studiously avoided by large ships, particularly if there is any swell. From it the tower on Mount Batten lies nearly in line with Lord Bovingdon's park gate and Penlee point, and though a low mark for such a distance, may be useful when fog hangs over the valleys in-shore.

The following are the bearings and distances from the shoalest part of the Hand Deeps:—Rame head N.E. by E.  $\frac{1}{4}$  E.,  $7\frac{2}{3}$  miles; Mewstone E. by N.  $10\frac{3}{4}$  miles; and Bolt head E.S.E., 21 miles.

On passing westward of the Hand Deeps do not open Rame church eastward of the barn on Rame head, until Wembury church comes well open northward of the

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\* A fog-bell is established at the Eddystone lighthouse, which is sounded in foggy weather *five* times in quick succession every *half-minute*.



Mewstone; and on sailing eastward of it, keep Lord Bovingdon's park gate, above mentioned, a sail's breadth open eastward of the low extreme part of Penlee point.

**PLYMOUTH SOUND.**—The entrance to Plymouth sound is between the Great Mewstone on the eastern, and Penlee point on the western side; within these it is divided into two channels by a magnificent breakwater, protecting an extensive anchorage. Plymouth is generally considered, and not without reason, the most capacious and secure rendezvous in Great Britain. It possesses two good harbours, Hamoaze and Catwater, of which the first named is at the entrance of the river Tamar, and, though somewhat contracted and circuitous, is by far the most considerable of the two; it is the principal resort of her Majesty's ships, and contains space sufficient for one hundred sail-of-the-line at moorings, independent of anchorage for smaller vessels in moderate depth of water, on good holding ground, and most effectually secured against every possible contingency in respect to wind and sea. Catwater forms the entrance to the river Plym, and with Sutton Pool, is frequented principally by merchant vessels and foreigners.

The land in the neighbourhood of Plymouth sound will be identified by the Mewstone; Rame head, with the small building (a ruined chapel) on its summit; a turreted beacon tower on Penlee heights, eastward of Rame head; the steeple of Rame church; Maker church; mount Batten; the high wall of the Rifle butt on Staddon heights; and the large white limestone forts at Staddon point and mount Edgecumbe park.

The Mewstones, two in number, are generally known as Great and Little Mewstones. The Great Mewstone is a huge precipitous rock, 194 feet high, lying in a southerly direction from Wembury point, the eastern boundary of the sound, from which it is distant nearly half a mile, though separated merely by a narrow channel; the Little Mewstone, which is just without it, is a dark rock of 48 feet high, about 100 yards to the south-west of the Great Mewstone, and both form admirable landmarks. Rame head, the extremity of the promontory which constitutes the western boundary of the sound, is very lofty, and, when viewed from southward, assumes a form completely conical.

**Breakwater and Light.**—The breakwater across the entrance of the sound has its western extremity at about  $1\frac{1}{2}$  miles E. by N.  $\frac{1}{4}$  N. from Penlee point, and thence extends towards Bovisand bay, directly across the Shovel shoal, terminating in the vicinity of Staddon or Statten point, from which it is distant 360 fathoms. The central portion of the Breakwater makes an angle with the true meridian of N.  $86^{\circ}$  W., and is in length 3000 feet, from each end of which an arm or head projects to the distance of 1050 feet more, so as to shut in that part of the sound which lies south-eastward of a straight line drawn from Penlee to Dunstone points.

The lighthouse on the west end of the breakwater shows a *fixed red* light at 63 feet above the sea, visible about 9 miles; the arc illuminated is  $303\frac{3}{4}^{\circ}$  (E. by S.  $\frac{1}{2}$  S. southward and westward to N.E.  $\frac{1}{2}$  E.); it shows *white* over the anchorage within the breakwater in the arc  $56\frac{1}{4}^{\circ}$  (N.E.  $\frac{1}{2}$  E. eastward to E. by S.  $\frac{1}{2}$  S.). A bell is tolled during fog or thick weather.\*

On the eastern end of the breakwater there is a conical beacon, bearing a mast

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\* For the purpose of guiding vessels entering the sound at night by the channel westward of the breakwater, a *white* light is shown 15 feet below the red light. The arc illuminated is  $13^{\circ}$  (S.W. by W.  $\frac{1}{2}$  W. southward to S.W.  $\frac{1}{2}$  W.); it is consequently shown over the channel guarded on the one side by the buoy off the Draystone, and on the other by that marking the Knap shoal.

and ball; this mast has steps, and the ball is fitted to receive within it six men. There is also a fort in course of erection inside the breakwater, abreast the middle of the central arm, from which it is distant 79 yards; the depth of water between it is  $4\frac{1}{4}$  fathoms.\*

**Dangers to seaward of the Breakwater.**—These are, the reef extending from the Little Mewstone; the Shagstone and rocks in its neighbourhood; the Tinker shoal, on the eastern side of the entrance; the Draystone; and the Knap and Panther shoals, affecting the Western channel.

**Mewstone Ledge.**—This ledge runs out  $1\frac{1}{2}$  cables in a south-westerly direction from the peak of the Little Mewstone, and its extremity is marked by a *red* buoy moored in  $7\frac{1}{4}$  fathoms at low water. The Shagstone on with the breakwater beacon, bearing N.  $1^{\circ}$  W., leads nearly 2 cables westward of this reef.

**Shagstone.**—The Shagstone lies outside Renny rocks, on the extremity of the extensive rocky ledge that projects in a westerly and north-westerly direction from Andern and Wembury points, and is distant from the Mewstone nearly a mile in a N.N.W. direction, and half a mile south-eastward from the Tinker shoal. It is, though small, a remarkable rock, being nearly square, and 9 feet above water. The ledge upon which it stands is continuous in a southerly direction to the Mewstone, and in a northerly and north-easterly direction into and around Bovisand bay; northward of the Shagstone the extremity (4 fathoms) of this ledge is marked by two *red* buoys.

**Tinker shoal.**—The Tinker shoal is the outer and south-easternmost of the dangers above-mentioned. It is three-quarters of a mile from the centre of the breakwater, and in length a quarter of a mile from east to west, and one-eighth of a mile in breadth, and has from 15 to 20 feet water upon it, the shoalest spot being on its western part.

Each end of it is marked by a *white* buoy, of which the western is placed at the north-west angle of the shoal, in 6 fathoms, and the eastern lies at the south-east angle of the shoal in 5 fathoms.

**Rocky Patches.**—Between the Tinker shoal and the east end of the breakwater are several rocky 4-fathom patches, two of which, near the centre of the eastern channel, are each marked by a *black* and *white* chequered buoy. These buoys are known as the fairway buoys. The outer or southern buoy, near which is 26 feet water, lies with the Shagstone on with the peak of the Little Mewstone, S. by E.  $\frac{3}{4}$  E., and the Breakwater beacon in line with the citadel flagstaff, N.N.E. The inner buoy has 25 feet

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\* **Time Ball.**—A time signal is shown daily, Sundays excepted, at 1h. P.M., by the instantaneous collapse of a cone suspended near the top of a flagstaff in the redoubt on mount Wise, Devonport. This hill is the general signal station of the port, and may be known by its southern green slope, as well as by its proximity to St. Stephen's church, which has a remarkable sharp spire. The cone is of canvas,  $4\frac{1}{2}$  feet in diameter, and painted black. It is suspended below the flag on the flagstaff, at an elevation of 175 feet above the mean level of the sea; and its collapse may be seen from most parts of Hamoaze, over the whole of Plymouth sound, and from those parts of Catwater used by sea-going ships. It may also be seen in clear weather with a glass at a considerable distance outside the breakwater when bearing between N. by W. and N. by E.

When the cone is not in use it hangs in a closed state on the flagstaff. As a preparatory notice to the observer, at 0h. 57m. P.M., the cone is extended to its perfect shape; and at the instant of 1h. P.M. of Greenwich mean time it collapses. Again, at 2 minutes later it is once more extended; and at the instant of 1h. 5m. P.M. it again collapses. The second collapse is made in order to verify the first, or in the event of its not having been noted by the observer.

This arrangement is temporary until a connexion is established by electric telegraph with the Royal Observatory at Greenwich; the time, however, may be fairly depended upon to within 1 or 2 seconds of time.

water near it, and lies with the breakwater beacon on with the citadel flagstaff, N.N.E., and the breakwater lighthouse on with the gamekeeper's cottage (at mount Edgcombe), N.W.  $\frac{3}{4}$  N.

*Draystone*.—The Draystone, 10 feet under water, lies  $1\frac{1}{4}$  cables from Penlee point in a south-easterly direction, and is marked at its extremity by a chequered *red* and *white* buoy in 5 fathoms. Vessels passing Penlee point should not approach this reef nearer than the depth of 8 fathoms; the tall sharp spire of the Roman Catholic church at Stonehouse (Plymouth) open of Redding point, bearing N.E.  $\frac{1}{4}$  N., clears it on its east side. The depth in the narrow channel between the Draystone and the point is 19 feet.

*Knap and Panther Shoals*.—The Knap and Panther constitute very nearly one continued shoal of sand and rock, which trends in a north-easterly direction, and is in length  $3\frac{1}{2}$  cables; the least water over the former is 20 feet: nor is there less over the latter. Each end of this shoal is distinguished by a *black* buoy. The buoy of the Panther (the north-east end of the shoal) lies in 5 fathoms; the buoy of the Knap (the south-west end of the shoal) in 6 fathoms.

**Dangers within the Breakwater.**—The dangers in the way of vessels seeking anchorage within the Breakwater are, Duke rock, on the eastern side of the Sound; and Queen's, and New grounds on the western side, under Redding point.

*Duke Rock*.—The Duke rock lies near the west end of a bank extending off the shore between Rams cliff and Staddon points, and is in the form of a crescent, the convex part of which is to the westward, and is marked near its outer or western edge by a *white* buoy in 5 fathoms water. This buoy lies a third of a mile N.N.E.  $\frac{1}{2}$  E. from the beacon on the eastern end of the breakwater, and the same distance N.W.  $\frac{1}{2}$  W. from Bovisand pier flagstaff. The least water on the rock (18 feet) is half a cable south-eastward from the buoy.

*Queen's Grounds*.—These are unconnected patches of rock of 20 to 24 feet water on the bank extending from the western shore of the sound in the vicinity of Picklecombe fort. A *red* buoy is moored close to their south-eastern edge, in 5 fathoms water. It may be remarked here that on the west side of the sound the ground is generally hard and rocky, and unfit for anchorage.

*New Grounds*.—There are several other rocky patches in the sound; but they all lie within, or northward and north-eastward of the anchorage, with the exception of the shoals known as the *New Grounds*, the depth upon which has been increased by dredging to  $4\frac{3}{4}$  fathoms. These shoals are marked by a *red* buoy lying  $4\frac{1}{2}$  cables N.E.  $\frac{1}{4}$  E. from the lighthouse on the breakwater.

**Directions for Western Channel.**—The western channel into Plymouth sound lies between the Knap and Panther shoals and the western shore. It is now the principal, and indeed the only entrance that can be used with safety by large ships at all times of tide.

Vessels from westward, when rounding Rame and Penlee heads, should keep Bovisand pier-head open southward of the breakwater beacon, till the lighthouse on the breakwater comes in one with the tower on mount Batten, bearing about N.E. by E.  $\frac{1}{4}$  E., as the last-mentioned mark will lead a ship clear of the Draystone, off Penlee point, and also of the Knap and Panther shoals. When up with the lighthouse, round that end of the breakwater at a convenient distance, and haul up to the eastward for the anchorage.

There is a good channel, 6 to 9 fathoms deep, between the Panther and the breakwater, which may be used in cases of necessity. The leading mark through is the Shagstone on with north high-water end of Great Mewstone, S.S.E.  $\frac{3}{4}$  E.



When working through the Western channel, if standing towards the Draystone, do not open Mount Batten tower westward of the Breakwater lighthouse. When the vessel is northward of the line of Stoke point on with north high-water point of Mewstone, S.E.  $\frac{1}{4}$  E., in standing towards the Knap and Panther, do not open the tower eastward of the lighthouse. When standing towards Queen's Grounds avoid shutting in the east end of Esplanade terrace with the east end of Drakes island; and in working along the south side of Drakes island, keep the whole of Cawsand open of Redding point.

Cawsand bay may be ranged by the lead alone; in working through, however, if the ship is of large draught, do not approach within a quarter of a mile of its southern shore, nor stand farther westward than to bring the west end of Drakes island touching Redding point. Having passed the line of the breakwater, or the lighthouse and beacon in one, keep a good half mile off shore.

Vessels from eastward intending to enter the sound by the Western channel, and being about half a mile outside the Little Mewstone, with the Breakwater beacon and Shagstone in line—which is the clearing mark for Mewstone ledge—should steer so as to pass outside Knap shoal, the fore clearing mark for which is Maker church in line with the gamekeeper's cottage N.  $\frac{1}{2}$  W.; and the back mark, the north high water line of Great Mewstone in line with Stoke point S.E.  $\frac{1}{4}$  E. After passing the Knap proceed as above directed.

*At Night* bring the Eddystone light to bear S.W.  $\frac{1}{4}$  W., and keeping it in that direction astern, run boldly in until the *red* light in the Breakwater lighthouse is seen, which will be right ahead if the bearing of the Eddystone has been preserved. Having made the red light, steer for it on a N.E. by E.  $\frac{1}{4}$  E. bearing until the *white leading* light in the lighthouse is seen, when the channel will be open, and keeping the white leading light in sight, run direct for it. After rounding the breakwater, haul to the north-eastward, but do not anchor till the *red* light has fully changed to *white*, which it will do when it bears S.W.  $\frac{1}{2}$  W.

**Anchorage.**—The limits of the best anchorage in Plymouth sound are comprised within the triangle formed by the following intersections:—Penlee point in one with the western end of the breakwater; Cawsand town in one with the western end of the breakwater; and St. John's Church, Plymouth, in line with the extremity of mount Batten. In the southern part of this space the depth is 36 feet, in the centre 30 or 33 feet, and in the north-eastern part 26 or 30 feet at low water, great spring tides.

By Admiralty regulations Her Majesty's ships are required to occupy the anchorage ground near the breakwater; and merchant vessels are to anchor in the north-east part of the sound. This latter anchorage is limited southward, by the two white-washed marks on Rams Cliff point in one, bearing S.E. by E.  $\frac{3}{4}$  E.; and westward by the Hoe obelisk, and east end of Windsor terrace in line, N. by E.  $\frac{1}{2}$  E.

Small vessels frequently anchor on the flat north of Drakes island, in 3 to 8 fathoms water, mud, sand, and gravel,—westward of the line between the Asia and Melampus buoys, and southward of the transporting buoys on the north side of Drakes island.

**Directions for Eastern Channel.**—When entering the sound from eastward, the Mewstone should not be approached nearer than half a mile till the beacon on the breakwater comes in one with the Shagstone bearing N. 1° W., as that mark will clear all the rocks westward of it. The eastern channel into Plymouth sound should not be attempted by vessels of considerable draught of water, unless with a free wind, because of the numerous rocks scattered in its vicinity, and the occasional scend or depression of the sea there, with south-westerly and south-easterly winds. The mark for this channel is, the beacon on the eastern end of the breakwater in one with the

obelisk on the Hoe bearing N. by E.  $\frac{3}{4}$  E.; this mark will lead between the Tinker and the Shagstone, and the shoals on either hand nearly up to the breakwater in not less than 5 fathoms water.

The channel is buoyed, and though the passage between the shoals is narrow, it is free from danger. After rounding the breakwater about a cable from the beacon, haul up north-westward for the anchorage, and be careful in so doing to avoid the Duke rock.

There is a channel frequently used by vessels between the east end of the breakwater, and the shoal patches of the Eastern channel. It is about three-quarters of a cable wide, and not less than 5 fathoms deep at low water, on the line of the flagstaff at the eastern part of Bovisand pier ranging from edge to edge of the north tower of Staddon fort. To sail through, keep the flagstaff in one with the centre of the north tower, E. by N.  $\frac{1}{4}$  N. This channel is also useful to vessels bound westward with scant westerly winds, when, owing sometimes to the crowded state of the sound, they have not room to make their boards to the westward.

Small vessels well acquainted with the place generally run through the Eastern channel at night by keeping Sutton pool pier light just open of Batten point; but no stranger should attempt it, as the light is not easily distinguished from those of the town.

*Note.*—When running into or out of the sound in the daytime upon any of the before-mentioned leading marks, bear in mind that so long as Bolt head is in sight south of the Mewstone, the vessel will be without or southward of all the shoals; and that Bolt head shut in with the Mewstone, ranges closely upon the tails of both the Tinker and Knap. When entering the sound from eastward, do not approach the Mewstone nearer than half a mile, till the Breakwater beacon is in one with the Shagstone bearing about North, which mark will lead 2 cables westward of the Mewstone reef in 11 fathoms water.

**Drakes Island and Shoals.**—Along the north side of Cawsand bay, and thence round Drakes island, is a rocky shoal or ledge, which may be said to connect the island with the western shore; over this there is a narrow passage known as the Bridge, the greatest depth in which is 7 feet at low water. The fairway over the Bridge is pointed out by two buoys, each with a staff; the southern is *red* and the northern *white*. The tower on Devils point in line with the cupola of St. John's church, N.  $\frac{1}{2}$  W., leads over the Bridge in the deepest water, and close to the buoys.

A flat of sand and mud extends from the north side of Drakes island fully halfway to the opposite shore. The north tangent of Wilderness point, on with the south tangent of Western King or Bottlenose point, W.N.W., skirts its northern edge in 4 and 5 fathoms at low water. A *black* buoy in 10 fathoms marks the north-west spit of this flat; from it Cremill obelisk is on with Wilderness point, and the east-end of Esplanade terrace is over the middle of West Hoe terrace.

Off the extremity of the shoal extending from the south-east side of Drakes island, there is a *black* buoy named Melampus, from which the flagstaff on the island bears N.N.W.  $\frac{1}{2}$  W., one-third of a mile; it is moored in  $4\frac{1}{4}$  fathoms. And at the north-eastern extremity of the ledges extending from the island, is a *white* buoy in 21 feet water, known as the Asia buoy.

*Winter Shoal.*—The Winter, a shoal of 10 feet water, lies nearly midway between Drakes island and Fishers Nose. Between it and the island the depth is not more than  $4\frac{1}{4}$  fathoms at low water, but eastward of it soundings of 10 to 18 fathoms can be obtained; it may therefore be considered as a rocky knoll rising from the ledge on which the island stands. Within the 3-fathom line of soundings the shoal is nearly square, and about 120 yards across; it is marked by the three following buoys, viz., one

(striped *red* and *white*) in 4 fathoms on its north-west edge, another (chequered *red* and *white*) in 5 fathoms on its north-east, and the third (*red*) in 3 fathoms on its southern edge.

**Mallard Shoal.**—The Mallard lies south of the Citadel, and directly in the fairway to Catwater; the least water over it is 12 feet, and the depth close to it on all sides is 5 and 6 fathoms. Its north-west extremity is marked by a *black* buoy in 7 fathoms.

**Cobbler Shoal.**—The rocky ledge extending from mount Batten, known as the Cobbler, is marked at its outer (western) end by a *black* buoy moored in  $2\frac{1}{2}$  fathoms. At the distance of half a cable north-east from this buoy there is a patch of only 6 feet water.

**Vanguard and German Rocks.**—These are the highest heads of several rocky patches lying South from Devils point. The German,  $2\frac{1}{2}$  feet under water, lies 146 yards from the blockhouse on the point, and is therefore only in the way of small vessels. The south extremity of Staddon point on with the high-water rocks south of Drakes Island, S.E., leads outside the German rock, and between it and the Vanguard.

The Vanguard, 3 fathoms under water, lies fully one-third across the channel, and is much in the way of large ships going to and from Hamoaze; its south side is marked by a *black* mooring buoy, in 5 fathoms. From the shoalest head (3 fathoms) mount Wise flagstaff is in line with the centre of the tower on Devils point, N.  $\frac{3}{4}$  W.; the Victualling office clock vane is on with the west end of Western King fort, N. by E.  $\frac{3}{4}$  E.; and the Camera mast on the Hoe is on with the south-west angle of West Hoe terrace, E.  $\frac{2}{3}$  N.

**Cremill Shoal.**—The spit extending from Cremill point is marked at its north-east extremity by a *black* conical buoy. The Breakwater lighthouse, open of Ravensness point (until the first building at Southdown opens of Cremill point, bearing West) S.  $\frac{3}{4}$  W., clears the shoal on its eastern side.

**Rubble Bank.**—The Rubble is a ledge of slate rocks extending from the south-west point of the dockyard fully half-way across the channel, upon which is a depth of  $3\frac{1}{4}$  to 4 fathoms. The Pollock, its shoalest head, is three fathoms under water. The western end of the ledge is marked by a *black* buoy.

Devonport monument in one with the entrance of the mast pond, N.E. by E.  $\frac{1}{4}$  E., leads eastward of the Rubble; the flagstaff at the N.W. angle of the Victualling yard, in line with the western or brewery chimney of the same yard, leads southward of it; and the Dockyard chapel tower open north of the master-attendant's office, N.E. by E.  $\frac{1}{2}$  E., leads northward of it.

The extensive mud flats fringing the rivers that discharge into the sound, can be cleared better by the assistance of local pilots and the chart, than by following any printed instructions.

**HAMOAZE.**—There are two channels into Hamoaze, of which that between the Winter and Mallard shoals is 12 to 15 fathoms deep, and that between the Winter shoal and Asia buoy 4 fathoms deep. Gill's soap factory chimney ranged from end to end of West Hoe terrace, marks the limits of the last-mentioned channel, and this passage is generally taken by large vessels, except at dead low water springs; for although the other is deeper the turning is sharp, and occasions some difficulty in the management of a long ship.

The wind from S. by W. southward to East, will enable a vessel to lie through either channel into Hamoaze; and from West northward to N. by E. will allow her to proceed from Hamoaze to the sound without a tack; but it must be remembered that near half flood the stream runs with great strength, particularly between Cremill point and Devils point, so that even in a steamvessel great caution is necessary, and it is therefore not desirable to move a ship during the strength of the tide.



When proceeding through either of the channels from the anchorage in the sound, steer to the north-eastward to bring the obelisk on the Hoe in line with the diamond mark on a high water rock below the Hoe, bearing N. by E.  $\frac{1}{2}$  E.; this will lead between the Winter and Mallard shoals: or, if intending to take the channel between the Winter shoal and Asia buoy, the leading mark through is Gill's soap factory chimney on with the centre of West Hoe terrace N.  $\frac{1}{2}$  W.

Keep either of these marks on until Cremill obelisk is in one with the second embrasure in Western King fort, W.N.W.; the latter mark will lead through the fairway north of Drakes island until the south-east angle of Esplanade terrace (on the Hoe) is in line with the south-west angle of West Hoe terrace (below the Hoe) E. by N.  $\frac{1}{4}$  N. Then haul to the south-west, and proceed with these latter marks on between Drakes island and the Vanguard rock, until the east extreme of Cremill quay is nearly on with Wilderness point, N.N.W.  $\frac{1}{2}$  W., or mount Wise comes well open of Devils point, about N.  $\frac{1}{2}$  W.; then haul a port to bring the cupola of St. John's chapel, Devonport, in line with the flagstaff on mount Wise bearing North, which will lead in mid-channel between Devils and Wilderness points.

The pilots, however, after rounding Vanguard rock, usually keep over towards mount Edgecumbe battery, to avoid the strong eddy on the flood caused by Devils point and the foul ground off it; when sailing thus it is necessary to bear in mind that Cremill shoal is steep, and should not be approached nearer than when the Breakwater lighthouse appears a little open of Ravenness point, bearing S.  $\frac{3}{4}$  W.

When the first building at Southdown comes open of Cremill point, bearing West, the vessel will be northward of the Cremill shoal, and may run up the harbour, taking care on nearing the Rubble to keep the south extremity of Drakes island touching Cremill point, S.E. by S., or the flagstaff at the north-west angle of the Victualling yard in one with the western or brewery chimney of the same yard, S.E. by E.  $\frac{1}{4}$  E.; either of these marks will lead southward of the Rubble. When the tower of the Dockyard chapel opens north of the master-attendant's office, N.E. by E.  $\frac{1}{4}$  E., vessels may anchor or proceed up the harbour.

**CATWATER.**—Catwater at the entrance to the river Plym is a well-sheltered harbour 190 acres in area, with a general depth of 2 to 3 fathoms. Access to it is through a narrow  $3\frac{1}{2}$ -fathom channel under the northern shore, and vessels anchor in a deep hole near the Turnchapel rock, where moorings are laid down; the space at low water is sufficient for 16 large ships to moor in tiers. There are three building yards, two patent slips, and a dry dock on its shores; the latter is 190 feet long, 57 broad, and 45 feet wide at the entrance,—the depth over the sill is 14 feet at high water springs, and  $9\frac{1}{2}$  feet at neaps.

There are two 4-fathom channels leading to Catwater, of which that between the Mallard and Cobbler shoals is followed by keeping the spire of St. John's church (Plymouth) in line with Fisher's Nose, N.E.  $\frac{1}{2}$  E.; and that between Mallard shoal and the Citadel, by keeping Ravenness ruin (mount Edgecumbe) between the two barracks on the west end of Drakes island, W.  $\frac{1}{2}$  S. The last-mentioned mark leads up to the mark for the best water to Turnchapel docks, viz., St. Andrew's church tower (Plymouth) in line with the lamp on the west pier-head of Sutton pool, N.N.W.  $\frac{1}{2}$  W.

**SUTTON POOL.**—Sutton pool is enclosed by piers at about one-third up from its entrance. Between the pier-heads the width is 350 feet, and the depth 22 feet at high water springs. On the east pier-head is a self-registering tide-gauge, over which is a dial-plate, which shows at all times the actual depth of water between the pier-heads. Within the pier-heads the depth is not more than 6 feet at low water, and the greater part, consisting of soft mud, dries. There are three building yards, two patent slips,

and a dry dock on the shores of the pool; the latter is 265 feet long, 54 broad, and 50 feet wide at the entrance,—the depth over the sill is 16 feet at high water springs, and  $11\frac{1}{2}$  feet at neaps.

*Light*.—A small *fixed* light (from gas) visible about 5 miles, is exhibited on the west pier-head of Sutton pool.

**MILL BAY** has a floating, a dry (or graving) dock, and a tidal basin. The *floating dock* has an area of 13 acres, and is 22 feet deep; it is 1200 feet long, 500 feet broad, and 80 feet wide at the entrance, with a depth of 26 feet over the sill at high water springs, and 22 feet at neaps,—vessels entering at springs can be kept afloat at neaps in a part of the basin prepared for the purpose. The *dry dock* is within the floating dock, and is 367 feet long, 100 feet broad, and 80 feet wide at the entrance, with a depth of 26 feet over the sill at springs, and 22 feet at neaps. The *tidal basin*, at the entrance to the floating dock, is protected by a pier extending from the east point of the entrance, outside which is a pontoon pier for the accommodation of steam vessels; it has an area of 35 acres, and a depth of 13 feet at high water springs, and 9 feet at neaps,—the channel through it is 300 feet wide, and has a depth equal to that of the floating basin. At the south side of the pier, west of the Trinity buoy store, the depth is 12 feet at low water springs. The pontoon is 300 feet long and 40 feet wide; the depth alongside at low water springs is 20 feet.

*Light*.—A *red* light is shown on the outer pier-head, and a *green* light on the pontoon; these in line will clear the Melampus shoal.

**STONEHOUSE POOL**, between the towns of Stonehouse and Devonport, has at its entrance, off the Victualling yard, a depth of 5 to 20 fathoms at high water; a short distance farther up the muddy bottom dries at low tide. There are two building yards in this pool.

**TIDES**.—At Devonport dockyard it is high water (full and change) at 5h. 43m.; in Catwater a quarter of an hour earlier, and at the breakwater half an hour earlier. With strong southerly and westerly winds the tide flows half an hour longer in both harbours.

The tides about the sound are pretty regular, both ebb and flood, upon an average running 6h. and 10m. each way. In Hamoaze the flood stream with springs continues to run about a quarter of an hour after high water at the dockyard.

The rise and fall of the tides depend much on the direction and strength of the wind: a S.S.W. wind generally makes the highest floods and lowest ebbs, northerly winds produce a contrary effect. Extraordinary spring tides rise 18 feet, but springs in general rise not more than 15 or 16 feet. Ordinary neap tides rise 8 or 9 feet, but if the wind be northerly seldom exceed 6 feet. Mostly, there is a difference of 4 feet between the height of an ordinary spring tide and that of a neap tide, and also the same difference between their fall at low water; but in extraordinary tides there is a difference of 6 feet.

Before the flood stream at the Eddystone runs eastward it will be nearly half-flood in Plymouth sound, and it continues to run until 9h.

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#### PLYMOUTH TO LAND'S END AND THE SEVEN STONES.

**LOOE**.—Looe harbour is about N.W.  $\frac{1}{2}$  W. 9 miles from Rame head, and  $12\frac{1}{4}$  miles N. by W. from the Eddystone. It is small, dry at low water, and frequented only by coasters and fishing vessels. At high spring tides the depth at the entrance is 12 feet and within  $9\frac{1}{2}$  feet; with high neaps it is  $8\frac{1}{2}$  feet at the entrance and from 6 to  $7\frac{1}{2}$  feet

in the harbour. The width of the entrance is about 150 feet. On full and change days it is high water at 5h. 26m.; springs rise 17 and neaps 13½ feet.

The roadstead is open to winds between S.E. by E. and S. by W., but sheltered from westerly winds. Vessels of 12 to 18 feet draught can anchor in the outer roadstead in from 4 to 8 fathoms, oozy bottom and clear of rocks, with the summit of Looe island between West and S.W. by W., distant from a third to three-quarters of a mile; those drawing 9 to 13 feet can lie nearer the shore, in 3½ or 5 fathoms, sandy bottom, with East Looe church tower bearing N.N.W. ½ W.

*Directions.*—Approaching Looe from westward, Looe island should not be approached nearer than when the beacon on Gribbin head is in line with Nealand point, W. by N. ¾ N., as that mark will lead a quarter of a mile south of the Rennies rocks, which extend from the south-east end of the island—the slated store-house on Downend point just open south of the Orestone, W.N.W., will also lead a cable south of them. When the tower of East Looe church is well open of the western point of the entrance to the harbour, N. ¼ W., vessels should steer N.N.E. for the anchorage.

The passage between Looe island and the main nearly dries at low water springs, but at most other times there is a channel for boats and small coasters. To run through from eastward, keep Dodman point just showing clear of Orestone rock, W. ½ S., and when the summit of the island bears S.E., haul to the south-westward to avoid the Kimlers rocks, which cover at a quarter flood.

**Polperro** is a fishing town 2½ miles westward from Looe island; it has two small piers. The entrance is between two high hills, and difficult to find.

*Udder Rock.*—This is a dangerous rock distant about 4½ miles W. ¾ N. from the N.W. part of Looe island, and half a mile from the shore. It is about 80 feet in length and 20 feet in breadth: at spring ebbs it is uncovered, and at low spring tides appears 3 feet above the surface; the depth is 6 fathoms within it and near to it; without it, 4 fathoms. The marks for the rock are a farmhouse by the shore in a line with a stone wall (which runs nearly N.N.E. ½ E.) and Orestone point on with the middle of Looe island. Keep Looe island well open of the main, and there will be no danger of striking on it.

**FOWEY.**—Fowey is distant 17 miles N.W. ¾ N. from Eddystone lighthouse, and 10 miles E.N.E. from Dodman point. From the entrance to Polruan pool, a distance of 3¼ cables, the depth is 14 to 21 feet at low tide; the bar (which has only 3 to 5 feet water on it at low spring tides) then commences; within this the average depth is about 24 feet. High water, full and change, at 5h. 25m., springs rise 15 and neaps 7 or 8 feet. A lifeboat is stationed at Fowey.

The beacon on Gribbin head, westward of Fowey (consisting of a square tower 84 feet high, with red and white horizontal stripes) is 257 feet above the sea. The headland is thus rendered easy of recognition, and readily distinguishable from St. Anthony head (Falmouth) or any other point upon that part of the coast.

Vessels anchor opposite the town of Fowey in 3 fathoms at low water, or lower down in Polruan pool. There is a good anchoring ground outside the harbour in 5 to 10 fathoms. With the tower of Fowey church over St. Saviour's point, and the three points to the eastward open, there is good anchorage in 7 or 8 fathoms; in deeper water than 10 fathoms the ground is foul.

*Directions.*—Fowey harbour may easily be known by the narrowness of its entrance, and the high land on each side; the entrance is little more than a cable across,—on the west side stands the castle and an old mill, and on the east side there are the ruins of an old church. It has a better outlet to the westward than either Plymouth or Falmouth, for lying in a N.E. by E. and S.W. by W. direction, vessels can leave it with a S. by E. wind. Coasters embayed between Rame head and



Dodman point during a southerly gale, may run for it even with loss of anchors; they should pass round the eastern point of entrance and run on to the bar, which, being soft mud, will not cause injury,—the flowing tide will help them off, and they can then run up the harbour as far as is necessary.

The danger to be avoided when approaching Fowey from south-westward, is the Cannis, a ledge of rocks about a quarter of a mile from Gribbin head, which is visible at half-ebb. Between this ledge and the point, the depth is only 10 feet, and the ground all over is foul. The mark to clear the ledge is Dodman point open to seaward of the Gwineas, with that rock bearing W. by S.  $\frac{1}{2}$  S.

Approaching Fowey from eastward keep about 2 miles from the shore until Dodman point bears W. by S.  $\frac{1}{2}$  S., or until Fowey church and the old mill are clearly seen, then steer boldly in between the points.

A small cove on the port hand, as vessels run in for Fowey, known as Predmouth cove, has a shingly landing beach.

**ST. AUSTELL BAY**, round Gribbin head, to the north-westward, is large, deep, and sandy, with regular soundings of 12 to 6 fathoms, the latter depth being pretty near to the shore. The best anchoring place is on the western side, where is shelter from westerly and southerly winds; and it is recommended to bring Black head, the western point of the bay, to bear about S.S.W.  $\frac{1}{2}$  W.; the ground is of sand and clay, and very good for holding. The bottom southward of Black head is foul, and bad for anchoring.

**Par.**—Par harbour, in the north-east corner of St. Austell bay, is of small extent. It has a pier or breakwater 200 fathoms long, which affords shelter to the vessels of the neighbourhood.

**Charlestown.**—At Charlestown, in the north-west corner of St. Austell bay, there is, at about a mile north-eastward of Ropehorn pier, a pier with an outer basin and a well-sheltered floating dock, capable of receiving, at spring tides, vessels drawing 13 feet. It is high water at 5 $\frac{1}{4}$ h.

**MEVAGISSEY BAY.**—Mevagissey, about 3 miles northward of Dodman head, is a tidal harbour with an area of about 3 $\frac{1}{2}$  acres, and an entrance 70 feet wide. It is high water (full and change) at 5h. 10m.; spring tides rise 18 $\frac{1}{2}$  feet, and neaps 14 feet. With the former the depth is 15 $\frac{1}{2}$  feet at the entrance, and about 14 feet within the harbour; but with the latter not more than 11 and 10 feet. About half a mile southward from Mevagissey is Portmellin, where is a clean beach for landing; off this place vessels sometimes anchor in from 5 to 8 fathoms water, sheltered from westerly winds. A large mackerel and pilchard fishery is carried on here during the season.

**Gwineas Rock.**—The Gwineas rock lies E.N.E., distant 2 miles from Dodman point, and three-quarters of a mile from shore. It is a black stone, 26 feet above water. Between it and the shore is a narrow channel 6 to 8 fathoms deep, through which small vessels occasionally go. A little eastward of it is the Yaw, a rock dry at low water. Northward of the Gwineas rock is Chapel point, which is surrounded by foul ground to the distance seaward of about a quarter of a mile; the depth between the point and Gwineas rock is 3 to 6 fathoms.

**Gorran Haven**, about a mile south-westward from Chapel point, has a small pier, with a clear sandy beach, off which vessels anchor with winds from W.S.W. and North, in 5 or 6 fathoms. When approaching it from southward give the point a berth to avoid a sunken rock lying S.W. from it.

**Dodman Point** is a precipitous bluff 363 feet high, having a steep face towards the east, and declining gradually to the westward; from it Nare head bears W.  $\frac{1}{2}$  N. 4 $\frac{3}{4}$  miles; St. Anthony point, W.  $\frac{3}{4}$  S., 9 $\frac{1}{4}$  miles; and Black head W.S.W., southerly, 17 miles.

The coast on the west side of Dodman point trends northward and south-westward about  $4\frac{1}{2}$  miles, or as far as Nare head, and forms an open bay named Veryan.

*Lath Rock.*—In the middle of Veryan bay, or nearer its western than its eastern shore, there is a rock 7 feet under water called the Lath, which lies with Gerran church in line with the extremity of Nare head, bearing West, and Porth Looe flag-staff N.N.W.  $\frac{3}{4}$  W. Gerran church, appearing about half the distance between Nare head and Gull rock, W.  $\frac{1}{2}$  N., leads south-east of the rock; to pass in-shore of it, keep the church shut in with Nare head. Close-to, outside the rock, the depth is 12 fathoms, rapidly increasing to 18 fathoms; inside the rock, between it and the shore, soundings may be obtained of 13 and 9 fathoms.

*Gull Rock.*—The Gull rock, 125 feet high, lies immediately off Nare head, but the passage between is safe for only small vessels, as there is a 3-fathom rock in mid-channel. At about a third of a mile S.W. from the Gull, there are two rocks, dry at low tide, known as the Whelps; to avoid these on the south side, keep Mawnan church open of Killygerran head.

*Bizzies.*—Nare head is high bluff land. The coast on its western side trends a little northward, and then turns southward, thus forming Gerran bay, in which is anchorage sheltered from winds from westward and north-westward. Here the depth is 7 to 3 fathoms, the latter being close to the beach. Off Greeb and Killygerran points, the southern points of the bay, there are several patches of 3 and 4 fathoms, named Bizzies, the outermost of which is above a mile from the shore; these it is necessary to guard against when running up the coast from Falmouth in a deeply-laden ship.

**FALMOUTH.**—From the Eddystone the entrance to Falmouth harbour bears W. by N.  $\frac{1}{2}$  N. distant 29 miles. It is an excellent harbour, conveniently situated with respect to the Atlantic ocean, and affording capacious and secure anchorage; hence it is used as a port of call as well as for shelter. Its entrance may be easily recognised by St. Anthony point (on its side) which has a lighthouse on it, and by Pendennis castle (on the western side) which stands on an elevation of 233 feet above high water. The entrance is a mile wide, but it is divided into two channels by Black rock, a rocky patch E. by S. one-third of a mile from Pendennis point.\*

The eastern channel between Black rock and the lighthouse is the best, as it is the wider of the two and carries the deepest water; with the wind at East a vessel can sail in free on the starboard tack, and at W.N.W. on the port tack. The western channel is only  $2\frac{1}{4}$  cables wide, but as the least depth in it is 20 feet at low-water springs, it can be navigated by vessels of large draught at half tide; with the wind at N.W. by W. a vessel will sail in free on the port tack, and although the high land of Pendennis may cause it to baffle, there will be no danger when she has shot within the Black rock.

**Docks.**—An outer or tidal harbour is partly formed, and two graving docks and a gridiron are constructed on the southern shore of Falmouth harbour, about half a mile from the town. One of these docks is 350 feet long, 50 wide at the entrance, and has 14 feet water over the sill at springs, and 11 feet at neaps; the other, 400 feet long, is 65 feet wide at the entrance, and has 16 feet water over its sill. The gridiron is 170 feet in length, and has 13 feet water on it at high springs. Spacious quays are built, and the railway is brought down to the docks.

A tidal harbour, 42 acres in area, is to be formed between two piers or breakwaters,

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\* In the Falmouth district, whose limits are Dodman point to the eastward, and the Lizard to the westward, there are 13 pilot cutters, varying from 30 to 40 tons, and 40 Trinity pilots, 20 of whom are entitled to take charge of vessels drawing 17 feet water and upwards; the remainder are for vessels of less draught (1870).

and the entrance, 500 feet wide between the pier-heads, will face the north-east. A portion of the harbour and also the channel leading to it from the main harbour will be dredged to 18 feet at low water, or 34 feet at high water springs. The eastern breakwater, 1400 feet long, is completed, and a depth of 22 feet has been made by dredging along its wharves at low water springs.

The floating dock, not yet commenced, is to be 14 acres in area, with an entrance leading from the tidal harbour 80 feet wide; it is to have 29 feet water over its sill at springs, and 25 feet at neaps.

**Lights.**—The white stone lighthouse on St. Anthony point, 62 feet high, exhibits from an elevation of 72 feet above high water a *revolving* light, which shows a bright face every 20 seconds, and is visible in clear weather about 13 miles. Viewed from eastward the light first appears on a N.W.  $\frac{1}{2}$  N. bearing; thence it will be seen round seaward and up the harbour.

A *fixed* light is also shown from the lighthouse, 37 feet below the *revolving* light. The arc illuminated is  $14^{\circ}$  (S. by W.  $\frac{1}{4}$  W. westward to S.S.W.  $\frac{1}{2}$  W.) and the western line of its visibility leads 2 cables eastward of Manacle rocks, to avoid which dangers the light was established. During foggy weather a bell is sounded.

A *fixed green* light is shown from the end of the eastern breakwater of the tidal harbour. It is 27 feet above high water, and visible about 3 miles.

**Rocks and Shoals.**—The *Old Wall* is a small rocky shoal, having on its shoalest part a depth of only 27 feet. This part consists of a conical point, so sharp that, should a ship touch it, the first swell of the sea must inevitably heave her off again; it lies  $1\frac{1}{4}$  miles due South from St. Anthony point. Within the Old Wall are a number of rocky 4-fathom patches of broken, uneven ground, extending nearly to the shore, and causing a considerable overfall, especially with S.E. winds and a flood-tide.

**Black Rock.**—Nearly in the middle of the entrance, and almost opposite Pendennis castle, lies Black rock, which appears at half-tide, and has a perch with a ball on it to indicate its position when overflowed by the tide. For a cable around it the depth is  $2\frac{3}{4}$ , 3, and 4 fathoms, but at  $1\frac{1}{2}$  cables S.W.  $\frac{1}{2}$  S. from the perch is a spot of  $2\frac{3}{4}$  fathoms only.

Within Black rock, northward and north-westward, towards the spit of Falmouth bank, there are some spots of foul ground with only 20 feet on them at low water springs.

**Lugo Rock** is a dangerous patch, distant one-sixth of a mile S.S.W. from St. Mawes castle. The black buoy off its southern side must be left on the starboard hand in entering.

**St. Mawes and Falmouth Banks.**—On the eastern side of the harbour, above St. Mawes Castle point, a hard bank or flat, stretches from shore, and is known as the St. Mawes bank; it extends almost halfway towards the western side, and its edge is quite steep with 8 to 15 feet water upon it, immediately outside which is a depth of 13 and 14 fathoms,—this edge is marked by two *black* buoys. From the outer extremity of the bank, Milor or Penarrow point bears N. by W., rather more than half a mile distant.

On the western side of the harbour there is also a bank, which extends from Pendennis point, directly across the approach to Falmouth, and is known as the Falmouth bank. The depth on it is generally  $2\frac{1}{2}$  to 3 fathoms, decreasing to one foot at Penarrow point. Abreast St. Mawes land, just above the castle, the two flats approach within 130 fathoms of each other, and the depth here in midchannel is 12, 15, and 19 fathoms; a *white* buoy marks the edge of the Falmouth bank at this part,—it lies opposite the first black buoy on St. Mawes bank.

At Penarrow point an extensive bank commences, and continues a long way up the river, and, along with that lining the eastern shore, narrows the navigable channel to



less than 2 cables. But, as any further description of Falmouth harbour is unnecessary, the principal anchorage being at or below Penarrow point, we need only allude to it; all vessels intending to ascend the river should obtain the assistance of a pilot.

A 2-fathom patch, known as the Governor rock, lies about a cable within the edge of the Falmouth bank, and is marked by a buoy chequered *black* and *white*; this buoy is 60 yards E. by S. from the rock.

**Anchorage.**—*Outer Road.*—From St. Anthony point towards the Manacles, there is good anchorage with the mouth of the harbour open, in what is known as Falmouth Outer road. By bringing Pendennis castle N. by W., and St. Anthony point N.E. by E.  $\frac{1}{2}$  E., about three-quarters of a mile, vessels will have 10 fathoms good ground. Or a ship may lie farther out in 11 or 12 fathoms, with Budoc church in line with the centre of Swan pool, Sandy bay bearing N.W. by N.  $\frac{1}{4}$  N., and Penare head open of Killygerran head, E.N.E. From these positions, if the wind veers to the eastward, it will be easy either to proceed to sea, or run into the harbour to Carrick road.

*Carrick Road* lies between St. Mawes and Falmouth banks, already described. In it is a depth of 7 to 17 fathoms, and the channel is only 320 fathoms wide, lying nearly N.  $\frac{1}{2}$  E. and S.  $\frac{1}{2}$  W.; here is the usual anchorage for ships of war. When moored here the hawse must be kept open, as southerly winds throw in much sea.

*Cross Road and St. Just Pool.*—Cross road is between the northern edge of St. Mawes bank and the bank extending from Penarrow point. At the turning of St. Mawes bank, into the Cross channel or road, the width is about 300 fathoms, increasing and decreasing 20 fathoms, more or less, towards St. Just pool. Here it becomes narrower, being only from 140 to 100 fathoms wide, and is 5 to 16 fathoms deep, and continues the same breadth to  $1\frac{1}{2}$  miles above Misis point, whence it becomes still narrower and shallower.

St. Just pool is capable of containing several first-class ships of war at moorings, and the channel leading from the pool upwards is capable of containing 10 or 12 more; and above Restrouquet point, up to Turnerware point, several sloops and frigates may lie secure. The channel, however, is narrow and circuitous, and spring-tides set through it at the rate of  $1\frac{1}{2}$  knots. Cross road and St. Just pool, though at an inconvenient distance from Falmouth, afford better shelter and anchorage than Carrick road. A mark for anchoring in St. Just pool is the tower of the Meteorological Observatory just open southward of Falmouth church about W. by S., and St. Kevern church over Pendennis point, S.W.; the depth is 12 or 15 fathoms, muddy bottom.

*St. Mawes Creek.*—The channel to this place is southward of the Lugo rock buoy, half a mile within St. Anthony lighthouse. There is good anchorage here for small vessels in  $1\frac{3}{4}$  and 2 fathoms water, before the town of St. Mawes.

**Falmouth.**—The channel to the anchorage off Falmouth is northward of the white buoy of the Narrows; in it the water gradually decreases from 3 fathoms at the entrance to one fathom at the town of Flushing. About  $1\frac{1}{4}$  miles beyond Flushing is the town of Penryn, where vessels with a draught of 12 feet water may go with spring tides; at the quay is usually a depth of 6 feet.

**Tides.**—In Falmouth harbour it is high water (full and change) at 4h. 57m.; springs rise 16 feet, and neaps 12 feet. The ebb sets out of the harbour, S.S.W. to the distance of a mile from the entrance, when it runs to the S.W., and farther off to the W.S.W. and W. by S. Off the Manacles the stream runs to the westward nearly 3 hours after low water by the shore.

**Directions.**—In all westerly winds, but particularly during summer, ships of war, having occasion to call at this port for supplies, will find it more convenient to anchor without the points of Pendennis and St. Anthony, than to entangle themselves with

the interior anchorage of Carrick road, or St. Just pool, from either of which it would be difficult to get to sea, in blowing weather, with the wind anywhere in the south-east quarter, unless with the aid of steam.

It is therefore recommended that no ship, in using this outward situation, anchor more to the eastward than to bring St. Mawes pier in a line with Carricknath point, or to the westward than Misic or Mesack point in one with Black rock perch, and on either mark from half to not farther than 2 miles from the shore. By doing this they will be sure to anchor on a bottom clear of rock.

When bound to Falmouth from westward at night, keep the Lizard lights open south of Beast point, W.  $\frac{3}{4}$  N., until St. Anthony *fixed* light bears N.N.E.; then steer for the light on this bearing, and having passed about a quarter of a mile westward of St. Anthony point, a N.  $\frac{1}{4}$  E. course for  $1\frac{1}{2}$  miles will carry to Carrick road.

During day Beast point kept open of Black head, W. by S., will lead three-quarters of a mile south of the Manacles. When St. Anthony lighthouse bears N.N.E. steer for it on that bearing, till Killiganoon house comes on with Penarrow (Milor) point N.  $\frac{1}{4}$  E., which will lead through the eastern channel, and through the Narrows into Carrick road.

The best entrance, which is three-quarters of a mile wide, is eastward of Black rock. When sailing through, give St. Anthony point a good berth, and at low water do not go within a cable of the Black rock perch; the leading mark is Killiganoon house on with Penarrow point, bearing N.  $\frac{1}{8}$  E., easterly, which will carry a ship in mid-channel into Carrick road, passing between the white and black buoys at the Narrows, and continuing on until the church of St. Budoc comes over the rising ground of Trefusis point. The Meteorological Observatory tower, just open southward of Falmouth church, will lead through Cross road, till St. Kevern church opens eastward of Pendennis point, with which mark a ship may anchor in St. Just pool in 14 and 15 fathoms.

In hazy weather give St. Anthony point a berth of 2 cables, and run in with the land of St. Mawes about a point on the starboard bow, and then steer for Penarrow point. Vessels should not approach the land at St. Mawes nearer than 2 cables, nor St. Mawes bank within 9 or 8 fathoms. With the wind at East, a ship will sail in free on the starboard tack, and with the wind at W.N.W., on the port tack.

Vessels not drawing more than 18 feet may safely pass between Black rock and Pendennis point, and at half-tide there is water for large ships. The leading mark is Feock house on with Penarrow point, bearing about N. by E.  $\frac{1}{4}$  E.; this will carry over Falmouth bank in 5 fathoms at half-tide. Or, when so far through as to have Black rock beacon and St. Anthony lighthouse in one, steer for St. Mawes castle until Killiganoon house and Penarrow point come in line, then proceed as before. In this channel a ship will sail in free on the port tack, with the wind at N.W. by W., and although the high land at Pendennis may cause the wind to baffle, there is no danger to be apprehended from it when the vessel has shot within Black rock.

Entering with a south or south-easterly wind, and intending to anchor in Carrick road, bring up with the small bower in 12 or 13 fathoms, rather inclined to St. Mawes bank, and moor with the best bower towards Falmouth bank in 12 fathoms; but with the wind westward of South, bring up with your best bower in 12 or 13 fathoms, inclined towards Falmouth bank, and moor with your small bower towards St. Mawes bank in 12 or 13 fathoms; the upper part of this road is the best anchorage.

Cross roadstead is the safest, the best, and has most room for mooring. Vessels here are recommended to bring up with either the best or small bower, in 10, 12, or 14 fathoms, placing the anchors so that you moor open to the southward, and when moored, to have the sheet anchor cleared to let go, should the ship in very heavy gales

and sudden gusts start or bring home either of her anchors. Ships frequently drive by placing their anchors too near the edges of the banks, yet there are no instances of ships receiving any material damage on the banks within the Narrows, or the entrance of Carrick road.

To sail out of Falmouth harbour, large vessels should get under sail at the latter part of the flood, or a little before high water, as then before half-ebb they would be clear of the harbour, and more than half-way toward the Manacles. Some vessels have worked out under double-reefed topsails, and passed the Manacles in one tide, the wind blowing hard.

**THE COAST.**—At  $1\frac{1}{3}$  miles westward from Pendennis point is Pennance point, northward of which, at the bottom of the bight, is a space of retained water, named Swan pool. Between these two points the cliffs are of regular height, and the shelving rocks at their base, which uncover when the tide is down, extend out about a cable. The bearing and distance from Pennance head to Rosemullion head is S.W. by S.  $1\frac{1}{2}$  miles; the cliffs between are 20 to 50 feet high, and about midway lies Maen Porth, a deep sandy bight with a summer-house at the head of it.

**Gedges Rocks.**—The Gedges, a very dangerous rocky patch, dry at low tides, lie 4 cables S.W.  $\frac{3}{4}$  S. from the extremity of Rosemullion point, and  $2\frac{1}{2}$  cables from the shore. Between them and the land is a very narrow channel about 12 feet deep.

**HELFORD RIVER.**—Helford river entrance, 4 miles W. by S.  $\frac{1}{2}$  S. from St. Anthony point, lies between Rosemullion and Nare points. It may be easily recognised by Mawnan church (on a hill on the north side) and by a castle (on the south side) named Little Dennis. Between the above points the depth is 6 to 8 fathoms, and thence it decreases very gradually for about  $1\frac{1}{2}$  miles up the river, where there is a bar on which is usually only 8 to 12 feet water at low tide.

When entering or leaving this river give the shore on each side a good berth; be careful to avoid the Gedges rocks, and remember that there is a spot of 18 feet water at rather more than half a mile N. by E.  $\frac{1}{2}$  E. from Nare point; when within Mawnan point anchor in 2 or  $3\frac{1}{2}$  fathoms (at low tide) with Mawnan church bearing E.N.E. Or, after passing Dourgan, the white house of Calamansack just touching the northern point of Porth Navas, N.W. by W.  $\frac{1}{2}$  W., will lead up to another anchorage in 4 fathoms, muddy bottom, the Old Ferry-house bearing N.  $\frac{3}{4}$  E. Helford is about 2 miles from the entrance of the river. The small vessels that frequent this river generally lie off the town.

**Gillans Creek** is on the south side of the entrance to Helford river. A rock (dry at low water springs) lies nearly in the middle of the entrance, which is only  $1\frac{1}{2}$  cables in breadth. Small craft lie sheltered here, although at low water springs the depth is only 2 feet within Erra point.

**Porthalla Cove.**—Porthalla cove is about a mile south-westward from Nare point. In it vessels anchor with west and north-westerly winds, in 8 fathoms, stony ground, at about half a mile from shore, with Manacle point bearing South, distant  $1\frac{1}{4}$  miles. This cove lies north-eastward from St. Kevern church: at its head is a clean shingly beach, where, in the event of urgent necessity, a vessel may run on shore at an hour's ebb. The tide flows here at 5 o'clock, full and change.

**Porthustoe Cove**, about a mile southward of Porthalla cove, is just northward of Manacle point; it is open to eastward, and on its northern side is a ledge of rocks (awash at low water) extending half a cable from the shore. In a S.  $\frac{3}{4}$  E. and S.S.E.  $\frac{1}{2}$  E. direction from Pendera head, the next point northward of Manacle point, are some detached low water rocks above a cable off shore; and in a S.E. by E. direction, distant 2 cables from shore, is a small shoal with only  $2\frac{1}{2}$  fathoms water on it.

**MANACLE ROCKS.**—The Manacles are a dangerous group of rocks situated



about 3 miles E.N.E. from Black head, and three-quarters of a mile S.E.  $\frac{1}{2}$  S. from Manacle point. They lie to the south-eastward of Porthustoe cove, and project in some cases as much as four-fifths of a mile from the nearest headland. One head of the rocks is always above water; the remaining part covers and uncovers alternately. It is evident on a close examination of this part of the coast, that vessels have in general made too free with the Manacles, for Mawnan church must be brought well open of the Nare head, bearing N. by W., to clear the Penwin and the Vaze. These two rocks, the outermost of the group, are six-tenths of a mile in an E. by N.  $\frac{3}{4}$  N. direction from the highest of the Manacle rocks; they lie nearly N.W. and S.E. from each other, distant half a cable;—Mawnan church exactly in one with the lowest part of the Nare head is the mark for them both.

A black bell buoy, with staff and ball and the word "Manacles" on its head, is moored in 20 fathoms water, at about half a cable south-eastward from the Penwin; hence the rocks are now well guarded, and there will be no risk of striking on them if care be taken to pass the buoy on its east (seaward) side.

Vessels rounding the Manacles should not shut in the extremity of the land at the Lizard point (the Beast) until the square tower of Mawnan church appears well open north-eastward of the lowest point of land at the Nare head; this precaution will insure an offing of at least a third of a mile from the Penwin and Vaze. The former rock is awash at low water, at which time the depth is only 5 feet on the Vaze.

At night keep the Lizard lights in sight southward of the Beast, until St. Anthony revolving light bears N.N.E., or the fixed light from the same lighthouse is in sight; the Manacles will then be cleared.

Between the Manacles and the shore there is a good passage, 5 to 13 fathoms deep, which should be used only by those acquainted with the locality. If from south-westward and compelled to take this channel, give the Manacles a good berth on the starboard side, and be careful to guard against the Meanland rock, and the rocks westward of it; this rock lies with Little Wrea (hereafter mentioned) bearing S.S.W.  $\frac{1}{2}$  W. distant 3 cables, and is covered at about a third flood—the small rocks westward of it are covered at a quarter flood—Black head open of Lowland point, bearing about S.W. by W.  $\frac{1}{2}$  W., clears it on its south side, and in one with Lowland barn on its north side. On Manacles point there is a signal-post, and numerous rocks extend a cable from it, which increases the danger of the passage.

*Wrea Rocks, &c.*—Lowland point is about a mile south-westward from Manacle point. About half-way between it and Coverack pier (at the bottom of the bay formed by Lowland and Chynhals points) is the Peny-macn, a patch of rocks extending southward from the shore more than a cable, and covered only at extreme high springs; hence to the eastward, rocks continue to range from one to  $1\frac{1}{2}$  cables from the shore, until abreast of the Great Wrea, and outside these are three rocks named Dava, Hoar, and Little Wrea.

The Little Wrea lies 2 cables E. by S.  $\frac{1}{2}$  S. from Lowland point, and covers at high water; at 200 feet from it, in the same direction, is a sunken rock of only 10 feet water; and 2 cables E.  $\frac{1}{2}$  N. from it is the Foam, a rock 4 feet under water, discovered in 1868. The Dava covers at half-flood, and lies with the highest of the Manacles in line with Little Wrea, E. by N.  $\frac{1}{2}$  N. The Hoar is 150 fathoms N.E. by E.  $\frac{1}{2}$  E. from the Dava, and likewise covers at half-flood. The Great Wrea bears from Lowland point nearly South, distant a cable; it is a high detached rock, and south-westward from it are several rocks.

*Coverack.*—As already stated, Coverack cove lies at the bottom of the bay formed by Lowland and Chynhals points. Here is a pier harbour, having an area of  $1\frac{1}{2}$  acres, and an entrance 70 feet wide; it is dry at low tides, but with high springs

is 12, and with high neaps 8 feet deep. On full and change days it is high water at  $4\frac{3}{4}$  h., and the greatest rise of springs is  $18\frac{1}{2}$  feet, and of neaps 14 feet. The cove affords shelter for coasters from S.W., westerly, and N.E. winds; the best anchorage is in about 4 fathoms, with the end of the pier W. by S.  $\frac{1}{2}$  S., distant  $2\frac{1}{2}$  cables.

Eastward of Chynhals point, and distant a cable from shore, are the Guthens, a patch of rocks covering at high water. Southward of this point, the low water rocks run off to the distance of a sixth of a mile, and nearly as much all the way to Black head. Off Black head there is a group of high rocks, part of which never covers, extending from the shore about 100 fathoms; outside its extremity is a detached rock covered at  $\frac{1}{4}$  flood.

**THE COAST.**—Between Black head and the Lizard there are several bights and coves, named respectively, Beagle, Cadgwith, Perran Vose, and Housel, which are at times frequented by coasters during strong northerly winds. The shores within these limits are rocky, and should not be approached nearer than a quarter of a mile.

At Cadgwith there is a good sandy beach, upon which a landing can be effected at any time of tide, with the wind from S.W. to West and N.E. A small rock (known as the Bo) lies in the entrance, and covers at a quarter flood.

The BEAST forms the eastern part of the land at the Lizard, and being considerably higher than the Lizard lighthouses, prevents those lights from being seen by vessels which approach nearer to Black head than the distance of  $1\frac{1}{2}$  miles. Upon it there are two beacons, each 8 feet high, coloured red, and distant 287 feet from each other, in a N.W. and S.E. direction; when in one they lead over the Vrogue rock.

*Craggan rock.*—The Craggan, a rock of 5 feet under water, lies S.  $\frac{1}{2}$  W. nearly two-thirds of a mile from Cadgwith cove, with Beast point bearing S.W. by W. nearly a mile; Landewednack church, West (a little southerly); and Treleague house in line with the western face of the entrance to Cadgwith. A small rock, named Va, lies off Perran Vose cove, at about 2 cables S.E.  $\frac{3}{4}$  E. from the extremity of the Balk; it is covered at 3 feet flood.

*Sperran Shoals.*—These are rocky 5-fathom patches lying eastward of the Vrogue. From the eastern or outer patch, the lighthouses on the Lizard bear W. by N.  $\frac{1}{4}$  N. distant nearly  $1\frac{1}{2}$  miles (the top of the western lighthouse is just showing south of the eastern one); Hot point N.W.  $\frac{1}{4}$  W. three-quarters of a mile; and Treleague house in line with the western face of Cadgwith cliff, N.  $\frac{1}{4}$  E.

*Vrogue.*—The Vrogue is a dangerous rock 6 feet under water, lying S.E. 4 cables from Beast point. Three red beacons on the land in its vicinity mark its position; one is on the Balk, and two (8 feet high and 96 yards apart) are on Beast point. From the rock, Ruan Minor church tower appears in one with the western ridge at the entrance to Cadgwith, N. by E.  $\frac{1}{2}$  E.; the beacon on the Balk bears N. by W. (westerly) distant  $8\frac{1}{2}$  cables, and is in line with the middle hummock (whitewashed) on Hot point; and the two beacons on Beast point are in one, bearing N.W.

The Balk beacon in line with the extremity of Hot point N. by W.  $\frac{1}{2}$  W. leads a cable north-eastward of the Vrogue; and Polpear point open of the Bumble, W.N.W., leads the same distance southward of it. The depth in the immediate vicinity of the rock is 6 and 7 fathoms, and the irregular rocky ground almost always occasions overfalls.

**LIZARD HEAD and LIGHTS.**—The Lizard is a bold and precipitous promontory, whence vessels generally take their departure on leaving the Channel, and use as a landfall when homeward bound. In clear weather it is visible at the distance of 24 miles, and on a nearer approach is readily recognised by its two white lighthouses. A vessel may run for it with confidence at all times, if the weather be at all clear; it is necessary, however, to remember that the dangers in its vicinity extend out nearly

half a mile. A lifeboat is stationed at Polpear point, about a cable westward of the lighthouses.

The lighthouses stand high, and are well placed as leading marks, for when in line they lead clear of the Manacles, at a very safe offing. The lights (*fixed*) are at the respective heights of 229 and 232 feet above high water, and bear from each other W. by N. and E. by S. distant 74 yards. At night, owing to their close proximity to each other, the brilliancy of the lights prevents them from being distinctly defined when opening out or shutting in.

*Stag Rocks.*—The Stags advance about half a mile in a southerly and south-westerly direction from the Lizard, and close to and among them is a depth of  $2\frac{1}{2}$  to 9 fathoms; within them are masses of detached rocks nearly joining the shore. The mark to avoid them on their eastern side is Ynys head (or the beach at Kennack cove) kept in sight eastward of the Beast; and on their western side, Godolphin hill (about 4 miles north-westward of Helstone) kept open of Meantale or Pednerifton point. The latter point will at the same time be in one with Rill point.

*Anchorage.*—Several anchorages, not generally known, suitable especially for small vessels, are in the vicinity of the Lizard. Of these we shall here notice the Searth (under Old Lizard head, at about a mile westward from the lighthouses), in which the depth is 5 fathoms, where a vessel may stop an ebb-tide, with the wind from N.E. to E.S.E.; the bottom is of clean sand, and it is usual to anchor half a mile from and under shelter of the Stag rocks, especially at low water.

Eastward of the Stag rocks, and nearly under the Lizard lights, is Housel bay, where vessels may anchor in the middle of the bay with the wind from N.W. to N.E. in 6 fathoms clean ground, bringing the outermost Stag about W.S.W. distant three-quarters of a mile. Ynys head well open of Hot point (N.E. of the Beast) will lead outside the Stags. There are three sunken 4-foot rocks, known as the Dales, lying S.E. of the outer Stag (the Macnehere) about a cable; the above mark will clear them, but do not steer eastward of S.E. with ebb-tide, until half a mile southward and eastward of the outer rocks.

In another bay (north-eastward of Housel bay) vessels may anchor in 6 and 7 fathoms clean ground, with west or south-west winds. The marks for it are Landewednack tower just appearing over the west side of the Cove, and Hot point S.S.W.  $\frac{1}{2}$  W. When approaching it beware of the Vroque rock and also of the Craggan, two sunken rocks already described.

Southward of the Stag rocks there is always an extensive rippling on both streams of tide, stretching as far seaward from the rocks as 2 or 3 miles; but this is chiefly occasioned by the unevenness of the ground, and when it blows strong from seaward, during the spring tides, the sea is very short and violent.

There is another extensive race or rippling south-eastward of the Lizard, occasioned by the confluence of the tides. At 2 hours' ebb the stream at the Manacles begins to run S.W., where meeting with the stream out of the bight between Cadgwith and Black head, which sets eastward from half-ebb till 5 hours' flood, they coalesce and both set S.E.; but at 2 hours' flood the stream at the Manacles again begins to turn, and this S.E. line of direction is warped more easterly, till at high water it ceases altogether.

*Boa Shoal.*—Although the depth upon this shoal is 6 fathoms, with S.W. gales the sea breaks very heavily. It lies N.W. by W.  $2\frac{1}{2}$  miles from the Lizard, and W.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  miles from Rill head.

*Mullion Island.*—Mullion island, 118 feet high and steep on its western side, is distant  $3\frac{3}{4}$  miles from the Lizard in a N. by W. direction. With strong easterly or south-easterly gales, vessels will find good anchorage in 10 fathoms N.  $\frac{1}{2}$  W. of this



island, with Mullion church E.  $\frac{3}{4}$  S.; but a sharp look-out should be kept, and care taken to be ready to get under way should the wind veer round to the westward.

**PORTH LEVEN** is  $8\frac{1}{2}$  miles northward of the Lizard point. Here is a pier harbour having an area of about 5 acres, and an entrance 140 feet wide, with a depth of 12 feet at high water springs, and 9 feet with neap tides; at the same times there are 12 and  $8\frac{1}{2}$  feet water respectively within the harbour, which is dry when the tide is down. On the days of full and change it is high water at 4h. 33m.; springs rise  $18\frac{1}{2}$  feet, and neaps 15 feet.

The entrance is open to westward; consequently in all westerly winds a run sets into the harbour, and makes it unsafe to be alongside the wharves. Care should be taken not to mistake Loo Pool for Porth Leven. Loo Pool is about a mile southward of Porth Leven, and is merely a deep inlet of retained water, the entrance to which is blocked by a bar of shingle 34 feet above low water spring tides.

A lifeboat is stationed at Porth Leven, and there is also one at Mullion, near the island.

**Dangers.**—Between Porth Leven and Mount St. Michael, on the eastern side of Mount bay, are several outlying rocks named respectively Great Row, Welloe, Iron Gates, Carn Mallows, Mountamopus, Stones, and Greeb or Greel, among which, and between which and the shore, except the last, are channels 5 to 12 fathoms deep.

*Great Row.*—The Great Row, a shoal 18 feet under the surface at low water springs, lies W.  $\frac{3}{4}$  N. 3 miles from Porth Leven, with Perranuthus church-tower in one with the inner saddle of the Cuddan, N. by W.

*Welloe.*—This rock dries 5 feet at low water springs; it lies two-thirds of a mile S.W.  $\frac{3}{4}$  W. from Rinsey beacon, and half a mile from the cliff below the beacon.

*Iron Gates.*—The Iron Gates, the outermost of the rocks in Mount bay, is 4 fathoms under water. It lies S.W.  $\frac{1}{2}$  S. 2 miles from Cuddan point, and S.S.W. three-quarters of a mile from Mountamopus buoy.

*Carn Mallows.*—The Carn Mallows is a rocky bank upon which are several spots of 3 fathoms. The shoalest part is nearly a mile S. by W. from Cuddan point, and half a mile S.E. from the 5-foot spot of the Mountamopus.

*Mountamopus.*—This shoal lies with Cuddan point N.E.  $\frac{3}{4}$  N., distant three-quarters of a mile. It is 5 feet under water, and a black buoy marks its south-western edge.

*Stones.*—The Stones (dry in two places at low water) is situated S.S.E. half a mile from Cuddan point. To pass northward of this shoal shut St. Michael's Mount tower in with Cuddan point.

*Greeb Rock.*—The Greeb (24 feet above water) is nearly midway between Cuddan point and Mount St. Michael. Its extremity is a quarter of a mile from shore, and a rock lies off it.

To pass westward of all the above shoals, bring Ludgvan church in one with the Mount tower, N.  $\frac{1}{2}$  E. Between the Iron Gates and Mountamopus there is a good channel, three-quarters of a mile broad and 6 to 10 fathoms deep; the mark for sailing through it is Castle-an-Dinas (Roger's tower) in line with Mount tower, N. by W. (northerly).

**MOUNT ST. MICHAEL.**—St. Michael's Mount (a high and conspicuous islet, at high tide, in the north-eastern part of Mount bay, having a castle upon it) lies N.N.W., 14 miles from the Lizard rocks. The harbour, dry at low water, is on the northern side of the Mount, and has at high water springs a depth of 11 feet, and  $7\frac{1}{2}$  feet at neaps; the entrance is open to the N.E., and is 124 feet wide, with a depth of 16 feet at springs, and  $12\frac{1}{2}$  feet at neaps. Upon the days of full and change it is high water at 4h. 27m.; the rise of springs is  $18\frac{1}{2}$  feet, and neaps 15 feet.

When turning into the harbour there are the Maltman, Guthen, and Hogus rocks to be avoided. The first (covered at the first-quarter flood) lies with the castle N.E.  $\frac{1}{4}$  N., and is a cable from the shore; Acton castle in line with the hubble of the Greeb rock, clears it on its south side in  $4\frac{1}{4}$  fathoms. The second (10 feet under water at low tide) bears W.N.W. from the castle, and is  $1\frac{1}{3}$  cables from the shore; Virgin mine in one with the highest hubble of the Hogus, N.E.  $\frac{1}{2}$  E., leads westward of it. And the third is a cluster of rocks lying north from the castle, and separated from the western pier by a channel a good cable wide, in which is a depth of 6 to 18 feet; when running in, keep in mid-channel to avoid the rocks skirting the base of the Mount.

Besides the Hogus rocks, there are the Penzeath, Long, and Cressar rocks, off the shore between Mount St. Michael and Penzance. The extremities of the Long and Cressar are each marked by an iron perch. Vessels passing to or from either Mount St. Michael or Penzance, will go southward of all these rocks, in 12 to 26 feet water by keeping the Mount end of the western pier, bearing E. by S.  $\frac{3}{4}$  S.

**PENZANCE.**—Penzance harbour lies in the northern part of, and is the principal place of shelter in, Mount bay. Its bearing from the Lizard rocks is N.N.W.  $\frac{1}{2}$  W., and distance  $15\frac{1}{2}$  miles. It is about a quarter of a mile in extent, and formed by two piers, within which vessels that are able to enter the harbour may lie in complete security from almost every wind; it is, however, dry at low tide. The depth is 17 feet at high water springs, and 13 feet at neaps; at the extremity of the south pier the depth is 23 feet at high spring tides, and 20 feet at neaps. On the days of full and change it is high water at 4h. 27m.; springs rise  $18\frac{1}{2}$  feet, and neaps 15 feet.\*

The harbour is capable of accommodating vessels of about 500 tons. Within it are three building yards, and a dry dock has recently been constructed. Cranes have been erected on the piers, and there are other conveniences for shipping.

**Light.**—The lighthouse on the end of the southern pier of Penzance harbour is 22 feet high, and coloured white. It exhibits at 33 feet above high water a *fixed* light visible about 10 miles, which shows *red* over an arc of  $80^\circ$  (from about a cable south of the beacon on the Raymond rock to about the same distance east of the beacon on the Gear rock) when the depth is 15 feet at the pier-head, which is quite 8 hours out of the 12; over the remainder of the circle it shows *white*. When the depth is less than 15 feet, the light shows *green* instead of red. A ball, hoisted on a pole at the end of the old pier, indicates during day a depth of 15 feet at the pier-head.

**Gear Rock.**—In a S.S.W. direction from the lighthouse, some dangerous rocks, known as the Battery rocks, extend out about 2 cables; and in nearly the same direction, but further out, there is an isolated rocky patch named Gear. This latter rock is covered at one-third flood, and is marked by an iron pole; close to it is a depth of 3 and 4 fathoms, and on the south side 5 fathoms.

**GWAVAS LAKE.**—Gwavas Lake, the bay formed by the indentation of land south-west of Penzance, has a depth shoaling from 6 to  $1\frac{1}{2}$  fathoms, and is a frequent place of anchorage in westerly or southerly winds; it is, however, not to be recommended as a stopping place in winter except as a preliminary step to entering the harbours of Mount St. Michael or Penzance. The mark for anchoring in 5 to 4 fathoms is St. Clement island just shut in with Penlee point: but large vessels usually anchor further out in 9 fathoms, with the Gear rock and lighthouse in one, bearing N. by E.  $\frac{1}{4}$  E., and Mount tower and St. Hilary church East. If a greater depth be

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\* There are sixteen Trinity pilots at Penzance; they have no vessel, but are supposed to be always on the heights, or in their boats on the look-out for ships. A lifeboat is stationed there (1870).

preferred, anchor in 10 or 12 fathoms outside the Low Lee and Carn Base rocks, and between St. Michael's Mount and St. Clement island; this latter anchorage cannot, however, be considered in Gwavas Lake.

**Newlyn**, a small harbour in Gwavas lake, is formed by a pier 208 feet long, which projects from the shore to the distance of about 80 feet. In it is a depth of 8 feet at high water spring tides, and at 5 feet at neaps, on gravel. The accommodation is sufficient for 30 or 40 boats of 15 tons burthen. At low water the sand dries outside the harbour to the distance of 104 feet.

**Carn Base Rock**.—The Carn Base is a small and dangerous rock distant one-third of a mile from the shore near Gwavas battery, upon which is a depth of 4 feet at low tides, while immediately around it are 5, 7, and 8 fathoms water. Its marks are St. Paul's steeple in one with the south side of Longesh hedge, W.  $\frac{1}{2}$  S., and the engine-house at Trithal in one with the east chimney of the coastguard station, North.

**Low Lee Rock**.—The Low Lee lies E.  $\frac{3}{4}$  N.  $3\frac{1}{2}$  cables from the extremity of Penlee point, with St. Paul's steeple in one with the middle of a barn, bearing W.N.W.  $\frac{1}{2}$  W., and the extremity of Penzer cliff in one with the north hubble of St. Clement island S.W.  $\frac{3}{4}$  W. This rock is distant 3 cables S.  $\frac{1}{2}$  E. from the Carn Base, and has but 4 feet water on it at low spring tides; hence it must be very cautiously approached, and especially because at a very short distance eastward from it the depth is 13 and 14 fathoms, while between it and the shore it is 9 and 5 fathoms. A red buoy is now moored at about 15 fathoms from its north-east side.

**Mousehole Harbour** is protected from eastward by St. Clement island, which bears N.W.  $\frac{3}{4}$  N.,  $14\frac{1}{2}$  miles from the Lizard. It is a small place formed by two piers, and the depth in it at high water spring tides is about 7 feet, while at neaps the depth is 4 feet. The bottom is gravel on rock.

St. Clement island is  $1\frac{1}{2}$  cables in extent, and surrounded by rocks under water, which extend from it a short distance. It is 25 feet high, and between it and the shore there is a narrow channel  $1\frac{1}{4}$  to  $2\frac{1}{2}$  fathoms deep, through which vessels of a light draught of water may pass.

The coast from Mousehole south-westward to Guethensbras point and the Runnelstone, should not be approached nearer than  $2\frac{1}{2}$  or 3 cables, as several rocks lie off it to nearly that distance. Before describing the Runnelstone and the dangers in its vicinity, we will give some general directions for Mount bay, and then continue the description of the coast as far as the Wolf rock, Cape Cornwall, the Seven stones, &c.

**Directions for Mount Bay**.—Approaching the shore between the Lizard and the Land's End from the offing, the soundings will be observed to decrease in tolerable regularity. The bottom is, generally speaking, coarse sand interspersed with whole and broken shells.

**From Eastward**.—Vessels approaching Mount bay from eastward with a westerly wind should haul in with the westernmost land until near St. Clement island, but must keep St. Paul's steeple in sight above the land, till northward of Penlee point; then steer for Penzance, taking care to keep the windows of the tower of St. Paul's church in sight until that tower is brought northward of the long hedge (about half way between Newlyn and Penlee point), which hedge will then appear to come straight from the church to the cliff. Then haul in for Newlyn pier-head, or keep a white house (in the corner of a field just above Newlyn) on with the middle of Newlyn pier-head, until St. Paul's church tower is lost to view, and St. Hilary's spire is open northward of St. Michael's Mount, when anchor with St. Clement island just shut in with Penlee point, in 5 fathoms,—the best ground in Gwavas lake. Observe to lay the small bower to the E.N.E., and the best bower to the W.S.W., in order to ride with an open hawse with S.E. and southerly winds, which bring a heavy sea into the road. The



before-mentioned steeple of St. Hilary's church is a tall white spire on the high land eastward of Marazion.

*From Southward.*—When between Cuddan and Carn Du points, and in a line for Gulval church, the soundings will gradually decrease from 20 to  $9\frac{1}{2}$  fathoms. The latter depth is about  $1\frac{1}{4}$  miles from the head of the bay; when in it haul westward and anchor, selecting a position in Gwavas lake, as already stated, according to circumstances.

*From Westward.*—Keep Godolphin hill (north-westward of Helstone and 532 feet high) open of Carn Du point, E.  $\frac{1}{2}$  N., to avoid the Runnelstone, and as that point is approached bring Mount St. Michael open southward of it to clear the Bucks.\* When off Carn Du point keep Tetter Du point well open southward of the Carn Barges to avoid the Lelland, a rock 2 cables eastward of Carn Du point which covers at one-quarter flood. Having passed the Lelland the shore may be approached to 3 cables. In rounding St. Clement islet give it a berth of a cable, and bring Trithal engine-house in line with York house, about N.  $\frac{1}{4}$  W., in order to pass eastward of the Low Lee and Carn Base.

To guard against Gear rock when turning in, take care not to shut in Little Godolphin hill with the S.E. side of St. Michael's Mount.

South-east and southerly winds send a heavy swell into Mount bay; but there is here, as in Tor bay, an underset to windward, which causes vessels to ride pretty easy. The harder the wind blows the stronger is the underset to windward.

As there is very little tide in the N.W. part of Mount bay, ships, when riding in it, always lie with their heads to the wind. With good ground tackle there is little risk of dragging, for the anchor will never start, unless the wind comes round to N.W. or North, and blows hard; in that event the anchor may come home, because the ground has a little descent to leeward.

In winter, the anchorage should only be resorted to as preliminary to entering the harbours of Penzance or Mount St. Michael. It should also be remembered, as already stated, that good anchorage may be had on the N.W. side of Mullion island (off the eastern shore of the bay) in strong easterly or south-easterly gales.

*During night* keep the red (or green) light at Penzance in sight when beating up the bay, to avoid the Low Lee and Carn Base, on the western side, and Long and Cressar rocks, on the northern side. If from eastward, and with a heavy ground swell, bring the red (or green) light to bear N. by W.  $\frac{1}{2}$  W., and then stand for it to avoid the Boa (6 fathoms) and the Iron Gates (4 fathoms), over which at such times the sea breaks very heavily. But in fine weather the seaman may haul to the northward when he thinks proper. The westernmost Lizard light kept in sight, S.E. by S., leads to St. Clement island.

**Runnelstone, &c.**—The Runnelstone is a small rock about 4 yards long and 2 yards broad, which shows at about 4 hours' ebb. It is a most dangerous obstacle to navigation, as it is in a part of the coast where the power of the tides is immense, and where there is a heavy ground swell from the Atlantic. It bears from the light-house on the Longships S.S.E. distant nearly 4 miles, and from Toll Peden Penwith South nearly three-quarters of a mile. The bottom outside (to seaward of) the rock is clear of sunken dangers, but there are rocks and foul ground eastward, westward, and northward of it. It is now guarded on its south side by a *black* bell buoy (bearing a staff and ball (which is moored in 16 fathoms water at about 70 yards S.W.  $\frac{1}{2}$  W. from

\* These dangerous rocks lie 2 cables off shore, just eastward of Tetter Du or Black Rock point, and cover at three-quarters flood.

the rock, with the beacons on the shore at Porthgwarrah\* N. by E., and the Longships lighthouse N.N.W.; no dependence, however, can be placed on the buoy remaining in its position, for it often breaks adrift.

To sail southward of the Runnelstone, especial care must be taken not to bring the beacons at Porthgwarrah in one until the base of the northernmost (the black and white) beacon is wholly visible above the land, or the Longships lighthouse bears N. by W., when the line of the beacons may be crossed, and vessels will pass southward of the rock in safety.

To sail northward, or inside of the Runnelstone, it is necessary to use the same degree of caution not to bring the beacons in one until the white part of the inner or northernmost beacon is entirely hidden by the land, and the Longships lighthouse comes just open of the land, when the line of the beacons may be crossed, and vessels will pass northward of the rock.

To sail through the Inner channel (the channel between the Lee Ore and the coast), which is considered the best, as the tide sets more regularly therein, and begins to run eastward (which it does for three hours only), one hour before high water on shore, shut in the Longships lighthouse with the land, and keep Tetter Du point just open of Castle Tereen or Logan point, bearing E.  $\frac{3}{4}$  S.

Vessels turning through the passage between the Runnelstone and Toll Peden Penwith, must be very careful, when in a line with the beacons, to put about the moment the white part of the northernmost beacon appears above the land.

As the dangers inside the Runnelstone are very numerous, a shipmaster unless possessing a very complete knowledge of the locality, should always go southward of it. The inner passage is safe only in clear weather and with a smooth sea.

The rocks in the vicinity of the Runnelstone are the Lee Mean, the Lee Ore, the Carnstone, and the Poldew. The Lee Mean is half a cable E.S.E. from the Runnelstone, and is awash at low water. The Lee Ore is in the middle of the passage between the Runnelstone and the main, at about 4 cables N.E. from the rock, and has 11 feet water over it at low tide. Between the Lee Ore and Lee Mean the depth is 5 to 8 fathoms, and between the former and the shore 5 to 9 fathoms. The Carnstone lies N.W.  $\frac{3}{4}$  N., a cable from the Runnelstone, and has 8 feet water over it at low springs. And the rocky 4-fathom patch, known as the Poldew, is one-third of a mile W.N.W. from the same rock. In stormy weather at low water the sea may be seen breaking tremendously over these rocks.

The tide flows at the Runnelstone at 4 $\frac{1}{2}$ h. on the days of full and change. The rock can be seen at about half-ebb, till which time the tide sets eastward. Godolphin hill open of Carn Du point, E.  $\frac{1}{2}$  N. leads southward of the Runnelstone.

**WOLF ROCK AND LIGHTHOUSE.**—The Wolf is about 180 feet in length by 130 feet in breadth at low water spring tides, and is bold all round. It lies 24 miles W.N.W. from the Lizard lighthouses; 7 $\frac{3}{4}$  miles S.W.  $\frac{1}{3}$  S. from the Longships light; 21 miles E. by S.  $\frac{1}{4}$  S. from St. Agnes light, Scilly islands; and 1 $\frac{1}{4}$  miles northward of a line drawn from the Lizard to St. Agnes. The depth within a mile of it on all sides is 34 fathoms, in the stream of it eastward and westward 38 fathoms, and between it and the land 34 to 37 fathoms. Until the erection of the lighthouse, the Lizard lights in one, E. by S., was the only shore mark to lead southward of it; but

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\* These beacons are on the west side of Porthgwarrah cove, near Toll Peden Penwith. The southernmost is of a conical form and painted red; the northernmost has a large and extended base, and is coloured black, excepting a small part of the pillar, which is painted white immediately above the base. When in a line with each other and the Runnelstone, they bear from the latter N. by E.  $\frac{1}{2}$  E.

these lights can be seen at this distance only in very clear weather, and from the deck of a large vessel.

The lighthouse on the Wolf rock is a handsome stone tower about 120 feet high. The light (shown at an elevation of 110 feet above high water) *revolves*, and exhibits alternate *red* and *white* flashes at intervals of 30 seconds; it can be seen at the distance of 16 miles from all parts of the sea horizon. A fog-bell is attached to the tower.\*

Vessels from eastward bound round the Land's End, when off the Lizard, should steer for the Wolf lighthouse, and not alter course to the northward, until Longships lighthouse bears N. by W.; by so doing the Runnelstone will be effectually cleared. In rounding the Land's End from northward, avoid bringing the Longships lighthouse westward of North, until the Wolf lighthouse bears W. by S.  $\frac{1}{2}$  S., whence a course may be steered for the Lizard.

*Carn Base*.—This is a rocky 9-fathom patch with a depth of 12 to 19 fathoms around it, lying nearly on an imaginary line drawn from the Wolf to the Longships, and with the Land's End N.E. by E.,  $2\frac{3}{4}$  miles. Between it and the shore the depth is 13 to 23 fathoms.

**LONGSHIPS ROCKS AND LIGHT**.—About  $1\frac{1}{4}$  miles W.N.W. from the Land's End, and 3 miles N.N.W.  $\frac{1}{2}$  W. from Toll Peden Penwith, are the steep and cragged rocks named Longships, on the largest and most elevated of which stands a white lighthouse, showing a *fixed* light at 79 feet above the water, visible 14 miles. See *Addenda*.

The rocks extend nearly half a mile S.S.E., and about 2 cables N.E. by E. from the lighthouse; the westernmost is not quite a cable from its base. They vary from 20 to 45 feet in height, and some are under water.

At two-thirds of a mile N.E. by E.  $\frac{1}{2}$  E. from the Longships lighthouse is a rock named Shark's Fin, which covers at two-thirds flood; it is steep, except on its western side, where a 9-foot shoal extends off a third of a cable. The Kettle Bottom, a rocky ledge, lies E. by S.  $\frac{1}{4}$  S., rather more than half a mile from the lighthouse; it is covered at three-quarters flood, and shoal water extends a quarter of a mile from it in a S.W. by S. direction. Nearly in the middle of the channel between the Longships, the Shark's Fin, and Kettle Bottom is the Fêles, a rock covered at a quarter flood, and steep all round.

Within the Longships, between the Kettle Bottom and the rocks lining the shore of Land's End, is a good channel nearly half a mile in breadth, and 7 to 13 fathoms deep, which is seldom used, except by coasters. The Brison rocks off cape Cornwall, N.N.E.  $\frac{1}{4}$  E., leads through it.

**LAND'S END**.—The Land's End, when viewed from southward or south-westward, appears with two detached hummocks, on the lower and western one of which is a triangular elevation; it may be seen in favourable weather at the distance of 24 or 26 miles. When approaching the land from this direction a third hummock with buildings upon it will present itself, and lastly, cape Cornwall. St. Buryan and Sennan church steeples are good marks by which to recognise the neighbourhood of the Land's End.

Anchorage with easterly winds can be had in Whitesand bay (between the Land's End and cape Cornwall) in from 12 to 15 fathoms, at two-thirds of a mile from shore,

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\* The lighthouse by day, and the light by night, converts this much dreaded danger into a safety beacon like the Eddystone, and greatly tends to simplify the hitherto dangerous navigation around the Land's End; for vessels are now enabled to fix their position by cross-bearings, and shape their course with a feeling of security past that still formidable danger the Runnelstone.



and outside the Bounder (a  $3\frac{3}{4}$ -fathom rock, in nearly the middle of the bay in the direction of N. by E. from Sennan church). The mark is cape Cornwall N.N.E.  $\frac{3}{4}$  E. The danger of being caught by a westerly wind causes this bay to be but little frequented.

**Brisons Rocks.**—The Brisons lie N.E.  $\frac{1}{4}$  N.  $3\frac{1}{4}$  miles from the Longships lighthouse, and half a mile from cape Cornwall; they consist of two rocky islets, 90 and 70 feet high respectively, and inshore of them are many rocks and rocky ledges above and under water. Vessels bound north-eastward should not bring the Longships light westward of S.S.W.  $\frac{1}{2}$  W. to ensure being about a mile outside the Brisons, and clear of the Vyneck (a rock awash at low water) northward of them.

**Cape Cornwall Bank.**—About  $6\frac{3}{4}$  miles N. by W.  $\frac{3}{4}$  W. from cape Cornwall is the commencement of cape Cornwall bank, which thence extends in a N. by E.  $\frac{1}{2}$  E. direction about 3 miles. The depth upon it is 13 to 18 fathoms, except in one spot, where there is probably less than 10 fathoms; this spot lies N. by W.  $8\frac{1}{2}$  miles from the cape.

**Bann Shoal.**—The Bann Shoal, 6 miles N.E.  $\frac{1}{2}$  E. from cape Cornwall bank, is a narrow rocky ridge about three-quarters of a mile long in a N.N.E. and S.S.W. direction, upon which is an irregular depth of 8 to 20 fathoms at low water springs. From the least depth (8 fathoms), which is near the south-west end of the shoal, St. Ives head or Battery point bears S.E. by S., distant  $12\frac{1}{2}$  miles; Gurnard head S. by E.  $\frac{1}{4}$  E., 10 miles; and Sennan church is in line with the extreme of the high water mark at cape Cornwall, S. by W.  $\frac{1}{4}$  W., 12 miles.

As the sea breaks heavily on Bann shoal and cape Cornwall bank, in bad weather, particularly during north-west gales, their locality should at that time be avoided, especially by small and heavily-laden vessels. The coast being distant, no good marks can be given for clearing them; but in proceeding northward round the Land's End, if the weather be clear, the Longships lighthouse kept on a S.  $\frac{1}{4}$  E. bearing will lead a mile westward of cape Cornwall bank. The Brisons islets S. by W., or at night the Longships light dipping and bearing S. by W.  $\frac{1}{2}$  W., will lead between the shoals; and cape Cornwall S.S.W. will lead a mile eastward of the Bann shoal.

**SEVEN STONES.**—The Seven Stones are a cluster of very dangerous rocks, nearly in the fairway between the Land's End and the Scilly islands. The north westernmost rock (the Pollard) bears from the day-mark on St. Martin E. by N.  $\frac{1}{2}$  N., 7 miles, and W. by N.  $\frac{2}{3}$  N., 15 miles from the Longships lighthouse, and is consequently in about lat.  $50^{\circ} 2' 33''$  N., long.  $6^{\circ} 7' 40''$  W. The Pollard appears at half-ebb. The South Stone is two-thirds of a mile from the Pollard, in the direction of S.S.E.  $\frac{1}{2}$  E., and appears at 5 hours' ebb. There are several other sunken rocks in the vicinity of these two latter, particularly northward and eastward of the Pollard, and westward of the South Stone; the former (generally denominated the Town) partially appear between the periods of 4 hours' ebb and low water; the latter have no particular designation. The whole of this group is very steep. The depth is 38 to 40 fathoms at the distance of a mile from the group, on all sides.

**Lightvessel.**—A lightvessel, with a ball at each mast-head, and bearing two *fixed* lights, is moored in 40 fathoms, about East, nearly 2 miles from the Pollard rock, and about the same distance E. by N. (northerly) from the South Stone. At this position the angle between the north and south extremities of the Scilly islands is  $22^{\circ}$ ; the day-mark on St. Martin bears W. by S.  $\frac{1}{4}$  S., and the Longships lighthouse E. by S.  $\frac{3}{4}$  S. The light on the mainmast is 38 feet, that on the foremast 20 feet above the sea; visible 10 miles. A powerful fog-horn is sounded in foggy weather at intervals of 10 seconds.

The marks by which the Seven Stones group may be avoided are as follows:—The

Telegraph tower on St. Mary, open eastward of the easternmost *car*\* on Great Ganilly (also open eastward of the remarkable conical-shaped rock named Hanjague), and the Telegraph shut in westward of Carniwethers point, though its parapet will still appear over the land between the said point and the day-mark; the former mark will lead half a mile south-eastward of the South Stone and of the rocks near it, and the latter will pass half a mile at least westward of the Pollard and the adjacent rocks.

In very fine weather, some objects on the Land's End become marks for the Seven Stones; for instance, the line of the two churches of St. Buryan and Sennan in one passes over the rocks north-eastward of the Pollard, and about half a cable from that rock.

**LAND'S END CHANNEL.**—Vessels from northward intending to go between the Scilly islands and the Land's End, should endeavour to bring the Seven Stones' lightvessel to bear westward of South, and those approaching from southward should keep it westward of North.

In the event of signals of danger being made at the Seven Stones' lightship, vessels should immediately tack and stand away for a considerable time in a direction opposite to that they are following.

*At night*, when south-eastward of the Seven Stones, vessels should not bring St. Agnes light more westerly than W. by N.; and when north-westward of them, not more westerly than S.W. On both these bearings the light will appear clear and bright, whereas if brought at all westward of either limit, and the eye be not elevated more than 10 feet above the water, it will be partly eclipsed by the blue *car* on St. Mary in one instance, and by the look-out *car* on the western end of St. Martin in the other. In stormy weather, the sea breaks with terrific violence over the Seven Stones, and renders a close approach very dangerous. The depth at equal distances northward and north-westward of Scilly and the Seven Stones is nearly the same, as well as the quality of ground.

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## SCILLY ISLANDS.

The Scilly islands and neighbouring rocks occupy a space of about 47 square miles, and are situated about 21 miles westward of the Land's End, between latitudes  $49^{\circ} 51'$  and  $49^{\circ} 59' N.$ , longitudes  $6^{\circ} 14'$  and  $6^{\circ} 28' W.$  They form an archipelago, shaped like a horseshoe; every roadstead is well protected by islands from winds from N.W., North, N.E., East, S.E., South, and S.W.: the least protected part is from W.S.W. to N.W. by W., but the sunken reefs in Broad sound form a natural breakwater to the West.†

The islands may be discerned in clear weather at the distance of 15 or 20 miles. An obelisk (38 feet high and somewhat in the form of a cone) on the eastern point of St. Martin is a conspicuous object when viewed from eastward; it is on an elevation 147 feet above the sea, and painted with red and white horizontal bands. On St. Mary are a Telegraph tower, a windmill and a fort; these are also readily distinguishable at a distance; the lighthouse on St. Agnes and that on Bishop rock, also constitute excellent land marks. The south-eastern shore of St. Agnes, St. Mary, and Menewethan islands, may be approached as near as half a mile, as there are no dangers to be apprehended beyond that distance; the Gilstone, the outermost rock on this

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\* The little elevations of stone, or mounds of earth, upon the islands of Scilly are denominated *cars*.

† A steamer runs thrice a week, with mails to Penzance, and a submarine telegraph connects the islands with Cornwall, London, &c.

part, is three-eighths of a mile E. by S.  $\frac{3}{4}$  S. from Peninnis head, the southern point of St. Mary.

The depth at about 20 miles southward of the Scilly islands is 58 to 62 fathoms, grey sand and broken shells; at the same distance northward of them it is 53 to 56 fathoms sand. Nearly South (true) from St. Agnes lighthouse, about 9 miles, there is said to be a bank of 20 to 25 fathoms water.\*

The near approach to Scilly from south-westward and westward requires great circumspection and judgment, on account of numerous outlying rocky ledges, the principal of which are the Nundeeeps, Crim, Bishop, Cribenack, Bishop's ridge, and Gilstone. The lighthouse on the Bishop, however, has greatly increased the safety of approach from these quarters;—from a position with St. Agnes' light E. by N.  $\frac{3}{4}$  N., and Bishop light N.N.E.  $\frac{1}{2}$  E., an E.S.E. course will lead within 8 miles of the Lizard.

The tidal current in the vicinity of the islands renders essential the preservation of a good offing. A short distance south-westward of the Crim and Bishop rocks, it runs with great rapidity to the north-westward, north, and north-eastward 8 hours out of 12.

Five of the Scilly islands are inhabited—viz., St. Mary, St. Agnes, St. Martin, Trescow, and Bryer. St. Mary, the largest island of the five, is about 2 miles long, and  $1\frac{1}{2}$  miles broad. St. Agnes (the lighthouse island) is about a mile from the western part of St. Mary; it is the southernmost of all the islands, unless the very large rocks to the S.W. of it are considered islands. Nearly a mile north-eastward of the northernmost part of St. Mary lies St. Martin, which is about half the size of St. Mary. Trescow lies about a mile westward of St. Martin, and not a mile to the north-westward of St. Mary; it is not so large as St. Martin. Bryer is westward of Trescow, and joined to it by a flat which nearly dries at low spring tides. Samson island, south of Bryer and south-west of Trescow, is about half a mile in length, and a quarter of a mile in breadth.

Among the islands are several harbours for vessels capable of taking the ground, and one also for large vessels, viz., St. Mary's road, though the ground, being loose sand, is not very tenacious, and indeed this is the case generally, the anchors coming home long before stay-peak can be obtained. The harbours in most esteem are Old and New Grimsby and St. Helen's pool.

**St. Agnes Light.**—The lighthouse (of stone, and whitened) is erected on high ground, and is a conspicuous object from almost all points of view. It shows, from an elevation of 138 feet above high water, a *revolving* light, which attains its greatest brilliancy in *one minute*, and is visible in clear weather from a distance of 16 miles. It is in lat.  $49^{\circ} 53' 33''$  N., long.  $6^{\circ} 20' 38''$  W. From the Lizard the bearing and distance to the light are W. by N.  $\frac{2}{3}$  N., 44 miles; from the Wolf rock lighthouse nearly W. by N.  $\frac{1}{2}$  N., 21 miles; and from the Longships light West,  $25\frac{1}{2}$  miles.

**Bishop Rock Light.**—The lighthouse is on the south-westernmost of the Scilly group, at the distance of 4 miles W.  $\frac{3}{4}$  N. from St. Agnes light. It shows a *fixed* light at 110 feet above high water, visible 16 miles from all parts of the horizon. A bell is sounded during foggy weather every 10 seconds.

**Pol Bank.**—The Pol bank, a rocky ledge of 13 to 16 fathoms, lies  $6\frac{1}{2}$  miles W. by S.  $\frac{3}{4}$  S. from St. Agnes lighthouse. It is surrounded by deep water, and is dangerous

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\* H.M.S. *Caledonia* struck soundings in August, 1831, upon a bank of 20 and 25 fathoms, in lat.  $49^{\circ} 45' 22''$  N.; St. Agnes lighthouse bore N. by E.  $\frac{1}{2}$  E., and the eastern extremity of St. Mary N.E. by N.



only to open boats in boisterous weather. Peninnis mill (St. Mary) in one with Goreggan, and open also eastward of the lighthouse, will lead over it.

**ST. MARY'S ROAD.**—This is an excellent roadstead in easterly gales, capable of containing a fleet of 200 sail. The depth is 5 to 7 fathoms, on good holding ground of blue clay, and access to it is through several channels sufficiently deep for a line of battle ship at low tide. At St. Mary there are facilities for repairs of ships—masts and spars being kept in stock by the persons engaged in such a business. There is likewise a patent rope-walk; also sailmakers, blacksmiths, &c., reside there; in short, the principal trade of the port is ship-building. A bountiful supply of fresh water can be had, and, at all times, large stocks of fresh and other provisions, as well as a supply of steam coal.

The anchorage in the roadstead is between St. Mary and Samson. The best position is with Hangman island (New Grimsby harbour) its own breadth open northward of Nut rock, about N.  $\frac{3}{4}$  E., and distant a third of a mile southward from the latter, in 4 or 5 fathoms water. Moor N.W. and S.E., to ensure an open hawse with westerly wind.

St. Mary's road affords shelter from all winds, except those between W.N.W. and S.W., which send in a very heavy sea; but with the wind from these quarters a vessel can always run to sea, through Crow sound, at a proper period of time.\* St. Mary's pool is a little place just eastward of St. Mary's castle, where small craft anchor opposite the town.

There are five channels to St. Mary's road: through Crow sound and over Crow bar, between St. Mary and St. Martin; St. Mary's sound, between St. Mary and St. Agnes; Smith sound, between St. Agnes and Annet; Broad sound, between St. Agnes and Samson; and North channel, between Mincarlo rock and the Carnbase, a  $2\frac{1}{3}$ -fathom rock.

**CROW SOUND.**—This channel has a bar, on which the depth is only 4 feet. On the south side of St. Martin there is an extensive flat of sand and rock, from which the bar extends across the channel—the deepest water is near to St. Mary. The leading mark over Crow bar is, Nut rock on with Southward-well point, the south part of Samson (as this mark leads over the Potts, it is better to bring the Nut rather more than its own apparent length on, or to the right of, the point;) when past the bar and Crow rock, go between the Potts and Greeb rock, and steer for the anchorage.

The tides here set out to the S.E. at three-quarters' flood, and continue till three-quarters' ebb; they then turn N.W. from the entrance of the sound to the bar, where they meet the tide which runs into St. Mary's road W.S.W.

To sail from eastward for Crow sound as far as abreast Inisidgen island, bring Crow-point earn (the south point of Trescow) open northward of Crow beacon and Bar

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\* To enable her to do this, she must observe the rise of the water at Crow rock, off Bants Caza (St. Mary). Crow rock (now marked by a beacon) is remarkable for having three heads, named Great Crow, Little Crow, and Crow Foot, by which the quantity of water over Crow bar may be estimated with great precision.

At high water, ordinary springs, there are . . .	21	feet on Crow bar.
At three-quarters' flood, or one-quarter ebb . . .	17	" "
At half-flood, or half ebb . . . . .	11	" "
At one-quarter flood, or three-quarters' ebb . . .	5	" "
At low water . . . . .	1	" "

More with westerly gales, and less with those from eastward.

The Great Crow is nearly awash with 5 hours' flood. The Little Crow is awash somewhat previous to 4 hours' flood, or after two hours' ebb. The Crow Foot is nearly awash at one-quarter flood or three-quarters' ebb.

point (the north point of St. Mary) N.W. by W.  $\frac{1}{2}$  W. Vessels should not make too free with this bearing, especially when nearing Inisidgen island, on account of the flats and dangers surrounding the south part of St. Martin. From Inisidgen to Crow bar the mark is, any part of Tolls islet open eastward of Inisidgen, until the marks for crossing the bar, previously given, come on.

To sail through Crow sound, between the Hats and Cadedna, keep the great carn of Menawore a little open eastward of Guthier rock, bearing N. by W.  $\frac{3}{4}$  W. This mark will carry to the New Grounds anchorage, where, with easterly winds, vessels may anchor until there is water enough to go over the bar; the mark for anchorage in  $2\frac{1}{4}$  and 3 fathoms, is Hanjague rock on with the northern part of Great Ganilly, and the west part of Great Ganinick on with the east part of Little Ganinick. Vessels sometimes stop on the east side of Crow bar, in 4 or 5 fathoms, with Nut rock a little open southward of the Crow; this may be done with N.E. and southerly winds, but not with easterly or S.E. winds, when it is extremely dangerous.

**ST. MARY'S SOUND** is by far the best and safest channel into St. Mary's roadstead. Ships from eastward must run in southward of St. Mary, steering for the south point (Peninnis head), until they are half a mile from it; the lead must be kept going, and they must not approach it nearer than the depth of 15 fathoms. About three-quarters of a mile N.W.  $\frac{1}{2}$  W. from Peninnis head is the Woolpack, a rock on the outer part of a reef extending southward rather more than a cable from the Hugh of St. Mary; this rock has a beacon on it. From the depth of 15 to 16 fathoms off Peninnis head, the water shoals to 12, 11, and 10 fathoms in the vicinity of the Woolpack, immediately off which is a depth of 7 and 6 fathoms. By keeping pretty close to St. Mary, the Spanish ledge (which lies about mid-channel, and has only 6 feet water over it at low tide) may be avoided; no part of this ledge can be seen at low water, but part of the Woolpack appears before low water. The Spanish ledge is marked by a conical buoy striped vertically *black* and *white*, moored in 6 fathoms off its eastern side.

When abreast the Woolpack, to which give a berth of about 2 cables, steer for Stevel rock, which is bold-to, with a depth close to it of 7 fathoms. Keep the star-board shore aboard, and the lead going, in order to avoid Bartholomew ledges; the nearest lies above a quarter of a mile W.N.W. from the Woolpack, and about the same distance S.W.  $\frac{1}{2}$  W. from Stevel rock, and nearly dries:—between them is a depth of 6 and 7 fathoms. The Bartholomew ledges are marked on their eastern side by a conical buoy (*black* and *white* vertical stripes), moored in 7 fathoms. Remember that Bartholomew ledges, and also Spanish ledges, must be left on the port-hand in going through the sound from eastward. The southernmost of the dangers in St. Mary's sound, the Little Ledge, was discovered so recently as 1862; it has only 7 feet water on it, and lies one-sixth of a mile southward of Spanish ledges.

When abreast Stevel rock, steer N.  $\frac{1}{2}$  W. until St. Martin's day-mark comes open of St. Mary; then steer for the roadstead until the same day-mark comes in one with Crow rock; or bring the castle on St. Mary to bear S.S.E., and anchor in 5 or 6 fathoms, or rather stand over towards the road, bringing Nut rock to bear N. by E.  $\frac{1}{2}$  E., at the distance of 2 or 3 cables. The shelter is from all but S.W. winds, and these always drive in a heavy sea.

The mark through St. Mary's sound, between Spanish and Bartholomew ledges on the one hand, and the Woolpack on the other, is the north-east part of Mincarlo exactly on with the highest part of Great Minalto, N.N.W.  $\frac{1}{2}$  W.

The mark through St. Mary's sound, between Spanish ledges and Round rock, is Hangman island (in Grimsby harbour) exactly on with Stevel rock, N.  $\frac{3}{4}$  E. To sail

from St. Mary's sound to the Pool, bring St. Martin's day-mark on with the west side of Greeb rock.

Between Spanish ledges and Round rock the depth is 5, 6, and 7 fathoms.

Another mark from St. Mary's sound to the roadstead, is Bow rock just to the left open of Dropnose point, the eastern point of Gugh island, near St. Agnes.

In St. Mary's sound the stream sets out S.E. by E. until it is 2 hours' ebb on the shore, then alters and runs N.W. by W.

**SMITH SOUND** is narrow but deep. Leave St. Agnes on the starboard, and all the western rocks on the port side, and steer in with Castle Bryer (an islet 67 feet high) just open eastward of Great Smith (a rock about half a mile north-westward of St. Agnes), bearing N. by E.  $\frac{1}{4}$  E. Run in with this mark on until abreast Burnt island, off the northern end of St. Agnes. Give this island a berth of nearly a quarter of a mile, and if drawing much water, do not approach Great Smith rock nearer than a third of a mile, because the Quoins (three small knolls of 2,  $2\frac{1}{2}$ , and 3 fathoms water) lie about a fifth of a mile from it; therefore, when at the above-mentioned distance from it, steer towards Annet island, and, when abreast Smith rock, bring Crow point (Trescow) N.E. by E., and it will lead in clear of all danger until the leading mark through Broad sound comes on. The Quoins may also be avoided, when near them, by opening Castle Bryer westward of Smith rock.

The tide at 4 hours' flood sets out S.E. until 2 hours' ebb, through all the western rocks as far as the Bishop lighthouse; northward of that lighthouse the harbour tide sets in.

**BROAD SOUND** is mostly used by vessels from south-westward. It is entered by either of two channels, known respectively by the names of North channel and South-west channel or Broad sound; each of these is dangerous to strangers, but the southern channel is the better of the two. When sailing through the South-west channel run in between the Bishop and Crim rocks, but nearer the former; these rocks bear about N. by E. and S. by W. from each other, distant nearly  $1\frac{1}{2}$  miles. The leading mark through this channel is Nornour island, its apparent breadth open northward of Bants Carn point (the north extremity of St. Mary), about E.  $\frac{3}{4}$  N. In proceeding with this mark, the ledges named Gunner, and Le Jeffrey, will be passed on their south sides, and Old Wreck ledge on its north side; after passing these dangers it will lead direct to St. Mary's road.

The Old Wreck is a sunken 3-foot rock, lying about a quarter of a mile N.N.W. from Annet head, and N.W. by W.  $\frac{1}{2}$  W. from the Great Smith; it is marked by a *black* buoy moored in 7 fathoms off its northern edge.

At the Bishop and also at the Crim, the flood-tide sets north-westward during the first half hour, and afterwards East, through St. Mary's road.

To sail through North channel into St. Mary's road, keep St. Agnes' lighthouse in one with the west side of Great Smith rock, S.S.E.  $\frac{1}{4}$  E., until the before-mentioned leading mark for Broad sound comes on. Steer then with that mark on for the roadstead, and anchor in 5 or 6 fathoms. This passage is between the Steeple (a small sunken 1-foot rock lying W. by S.  $\frac{1}{2}$  S. from Mincarlo rock, two-thirds of a mile), and several rocks off Samson, on the one side; and the Carnbase, Nundeeps, and Jeffrey on the other;—the Carnbase and Nundeeps have each 14 feet water over them, the Jeffrey only 2 feet.

The passage northward of the Crim (between it and the Nundeeps, which lie about E. by N.  $1\frac{1}{2}$  miles from the Crim) is exceedingly dangerous, and ought never to be attempted without a pilot. The mark through it is St. Agnes light S.E.  $\frac{1}{2}$  E.

A vessel falling in with the Bishop lighthouse at low water, for about half an hour



and no more, will meet with a stream setting to the N.N.W., and on standing to the northward, will find the tide shifting until a mile northward of all the islands, where it sets nearly East. At the Bishop, at this half-hour's flood, the stream sets easterly through St. Mary's road, and as far as St. Martin's head. When tacking in Broad sound, care is required not to go too far southward among these rocks, for as the tide flows, it parts, turning away southward, and if too far northward it will do the same; it is therefore necessary to take short tacks to get out. If the weather be so bad that it is impossible to carry sail, or if a contrary tide be experienced, steer in for the Bishop or Crim, as before directed.

**NEW GRIMSBY.**—This harbour lies westward of Trescow, between it and Bryer. The entrance (at the north end of those islands) is very narrow and difficult, but when within, a vessel will ride quite secure in 5 fathoms. Off the north-west end of Trescow are the Kettle and Kettle Bottom, two rocks always above water. Sail in on their west side, keeping the starboard headland close on board, and anchor opposite Hangman island, in 5 fathoms; here moor, or run further in, into less water, or lie aground at low tide. The mark for sailing into New Grimsby is, the castle of St. Mary (by some called Star castle) just open westward of Hangman island.

There is also a passage to this harbour over Trescow flats, at tide time; it is, however, only suitable for vessels of light draught, and the assistance of a pilot is indispensable. The depth at high water, spring tides, is about 17 feet, and at neaps 11 feet.

In New Grimsby sound, the flood sets in northward  $1\frac{1}{2}$  hours, and then out N.W. 3 hours. At this time it turns and sets in again  $4\frac{1}{2}$  hours, or until it is half-ebb; it then changes, and runs out during the other 3 hours. But, between Samson and Bryer islands, the tide sets in 8 hours from westward, and then runs out westward till low water.

**OLD GRIMSBY.**—Old Grimsby harbour is on the eastern side of Trescow, between it and the sunken rocks south-westward of Menawore. The anchorage is tolerably good, but the entrance is narrow and intricate, and not to be used by strangers, without a pilot. The leading mark in is Guther's island, its own length open westward of Norwethel island, or midway between it and Long ledge. At the entrance the depth is 10 and 11 fathoms, and thence decreases to 5 and 4 fathoms opposite Merchant's point; near Long point it is 2 fathoms, and abreast the old boat-house only  $1\frac{1}{2}$  fathoms. The shelter in this harbour is almost complete from all quarters, and vessels can leave with any wind.

**ST. HELEN'S POOL.**—The entrance to St. Helen's pool, between St. Helen and Tean islands, is narrow and intricate, and, although there is a tolerably good anchorage within, it is from the above cause little frequented.

To sail in, between Deep ledge and Round island, keep St. Mary's castle exactly on with the eastern Gap rock, bearing S.S.W.  $\frac{1}{4}$  W.; pass between that rock and St. Helen, and enter the pool over a bar of 3 feet at low water,—in the pool at that period of tide the depth is  $1\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms. To sail at tide-time over St. Martin's flats for St. Helen's pool, bring St. Helen's landing cern exactly between the two high cerns of Menawore, bearing about N. by W.  $\frac{1}{4}$  W.; the depth at springs will be 18 feet, and at neaps about 12 feet.

**TEAN SOUND.**—Tean sound, like Old Grimsby and St. Helen's pool, is inaccessible by strangers without a pilot.

**St. Martin's Head** is the easternmost point of the island which bears that name, and, as already mentioned, is distinguished by a landmark. Northward of this head is St. Martin's bay, where there is anchorage in 15 fathoms.

**TIDES.**—The tides which come through Broad sound from westward set East through St. Mary's road for the east end of St. Martin; there, at 4 hours' flood, it

meets the tide coming round St. Martin's head, and occasions at Hanjague a race; it then sets away E.W. by S. to Menewethan island, and meets the Crow sound tide, which sets out S.S.E.; these tides frequently, with springs, form a great race or rippling, and go off to the southward together.

South-eastward and South of St. Agnes there is a great rippling between 4 hours' flood and 2 hours' ebb, caused by the confluence there of the two streams of tide at that period. This ebullition is further increased by the unevenness of the ground over which the water runs: sometimes it extends as far seaward as 3 miles, but gradually subsides as the tides assimilate.

It is high water among all the islands at 4h. 40m. on the full and change days; the water rises in ordinary spring tides 18 to 20 feet.

When the weather is calm, the current flows round all the islands E.N.E.; but with northerly winds and neap tides, N.E.; when blowing hard and from southward, it will flow an hour longer, and with northerly winds an hour less. Two leagues southward of Scilly, the tide appears to run straight eastward and westward, and for nearly equal portions of time, but near the islands they are subject to the alterations before noticed.

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## APPENDIX

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### GENERAL REMARKS UPON, AND SAILING DIRECTIONS FOR, THE ENGLISH CHANNEL.

**GENERAL OBSERVATIONS.**—Although the approach to the comparatively narrow waters of the English Channel should always be made with caution, it is more especially necessary during winter, when the sun and stars are often obscured, and what is generally known as “dead reckoning” is the seaman’s principal guide.

When approaching the Channel, it should ever be borne in mind that even under the most favourable circumstances the frequent use of the lead is desirable; but during the absence of celestial observations the lead becomes of primary importance, and its constant use is absolutely indispensable to safe navigation.

Many vessels, by neglecting this simple precautionary measure, have been found within the Scilly Islands, unconscious of their position; and instances are only too numerous where such neglect has resulted fatally to ships and crews among the dangerous Minquiers rocks, on the coast of France. Such disasters are all the more lamentable when, humanly speaking, they might have been averted by simply using the lead and obtaining a continuous line of soundings.

It must not, however, be supposed that an occasional cast of the lead is all that is required, when, from the state of the weather or other causes, there is doubt respecting the exact position of the ship; for, as will be shown hereafter, an occasional cast *only* may possibly be a fruitful source of danger. By referring to the bank of soundings at the entrance of the Channel, it will be evident that a continuous line of soundings is essential, for the depths on the plateau are very irregular, and comparatively shallow soundings of the same depths will be found as far westward as long.  $10^{\circ}$  W., as well as near the land.

The decreasing depths of water therefore are too irregular to serve as a guide, nor is the quality of the bottom of sufficiently distinctive character to be relied on; for instance, when approaching on the parallel of Scilly or  $49^{\circ} 53'$  N. the depth of 73 fathoms may be struck 150 miles off the Scilly islands, as well as within 50 miles of the group, and although at the outer sounding the bottom is generally of fine sand, whilst at the inner sand and ooze prevail, the distinction is too slight to be serviceable.

A similar difficulty may be experienced on what is generally considered the best parallel for approaching the Channel, viz.,  $49^{\circ} 20'$  N.; here a depth of 73 fathoms, fine sand, may be found in long.  $10^{\circ} 20'$  W., and the same depth and similar bottom be met with 125 miles further to the eastward on the Channel course. The cases cited above are sufficient to illustrate the absolute necessity for continuous soundings; for, supposing a ship to be deemed to be on the outer spot, whilst she is actually on the inner, the result may be most disastrous; whereas, if frequent soundings be obtained,



the comparison of the intervening depths between the two positions with those marked on the chart will give increased confidence, and lessen the possibility of mistake. Thus frequent soundings should be the rule, and seamen will do well to bear in mind that the value of the lead is enhanced in proportion to the frequency of its use.

**COMPASSES.**—Strict attention should be paid to the compass, as neglecting to apply the error arising from deviation may—especially in iron vessels—cause great error in the latitude.

When returning from a distant voyage in southern latitudes, it will be a useful precaution previous to entering the Channel (particularly in an iron vessel), to take advantage of fine weather, and place the ship's head for a short time on the usual Channel course, in order to determine the deviation from actual observation of the sun, or other heavenly bodies.

There has lately been published Tables of Time-bearings, which dispense with computation; for by their means, and a single compass bearing of the sun, the combined amount of variation and local deviation is determined by inspection. The value of such knowledge, so easily obtainable when approaching narrow waters, say the English Channel, after a long voyage, must be too apparent to the practical navigator to require comment.

By means of these simple elements, viz., apparent time at the ship to the nearest minute, latitude, and sun's declination (the two last need only be approximate), the sun's true bearing is found in the Tables. If at the same time the sun's compass bearing be taken, the difference must be the *whole error* of the compass; and as the geographical variation can always be procured from the chart of magnetic curves, it is evident that the difference between it and the *whole error* must be the deviation for that point of the compass to which the ship's head was directed when the observation was taken. Thus, in mid-ocean, the sun will ever prove a check on the compass, and the silent monitor need no longer be distrusted.

No opportunity of ascertaining the ship's real position should be lost, and the navigator would do well to avail himself of the various methods by which the merest chance observations of heavenly bodies may be turned to account, including the simple and ingenious problem known as "Sumner's method."

**WINDS.**—Although the direction of the winds at the entrance to the English Channel is more or less uncertain throughout the year, those that most frequently prevail are from the western quarter, which generally blow during two-thirds of the year. Gales from westward are felt in all seasons, but from November to March inclusive they are most frequent, and generally last three or four days. Of these, a S.W. gale is considered the most dangerous in the eastern part of the Channel, for when accompanied by rain it blows in violent gusts, and sometimes suddenly changes its direction to N.W., North, and even to N.E., without losing its strength, and causes in a few hours a heavy sea upon the French coast southward of cape Gris-nez. If the wind remains fixed in either of the latter points, and its force moderates, the weather becomes fine; but should it back round to the S.W., bad weather is sure to return. It has been generally remarked that those gales that occur during spring-tides are more violent and last longer than those that take place during neaps, and that it is at the beginning of the flood they acquire their greatest strength.

Gales from North to N.E. are also violent, but usually last only 24 to 36 hours, and the wind does not shift as it does with those from westward. They cause a heavy sea on the flood stream, and during their continuance the land is generally covered with a white fog, having the appearance of smoke. This is also the case with all easterly winds, which are sometimes of long duration, and blow with great force.

When S.E. winds are accompanied by rain they are often violent, and almost always turn into gales, during which the wind in the squalls flies quickly round to N.E., and sometimes to North and N.W.; at this time it is dangerous for a vessel to be on the French coast. If it remains fixed in either of the latter points, and moderates, the weather is soon re-established, but should it return to the S.E. or South, the bad weather will continue.

Moderate winds from N.W. to N.E. bring fine weather. In summer the N.E. winds blow more particularly in the afternoon. In the morning there is a light breeze from the S.E., but towards noon it changes to N.E. and freshens; towards evening it decreases; at night a calm ensues, and the cool air condenses the vapours. When this condensation does not take place, it is a sign of a change of wind.

Calms are of rare occurrence, and do not last long, except in summer. When they occur during winter, it is regarded as the precursor of bad weather. The most certain indications of bad weather are, swell in the offing during a calm, and surf on the coast.

In wet winters snow is abundant, and when it blows, the wind continually changes its direction, and the snow, which whirls and obscures the air, prevents the land from being seen. During the intervals of these snow showers, there is often great difficulty in recognising the coast, as the snow completely changes its appearance.

The greatest quantity of hail falls during the months of March and April. These hail showers cause sudden changes in the direction of the wind, and are consequently dangerous to sailing vessels navigating near the shore.

When strong westerly gales continue, an easterly current is frequently forced up the Channel; but with steady easterly winds, the current has often been found to set out to the westward; more particularly when the Bay of Biscay is open, a south-westerly current is liable to be experienced.

Should a storm arise suddenly with a N.E. wind, vessels riding in the Downs, if outward bound, can get under way immediately, and proceed down Channel; or if homeward bound, and not choosing to ride out the gale, they can run in to the westward of Dungeness, where protection will be found. At the same time, ships lying in Margate roads may either purchase their anchor or slip their cables, and run into the Medway or Thames; but if unable to weather the fairway buoy, they can enter the East Swale, and anchor in safety.

Vessels overtaken by a storm, if westward of the Isle of Wight, may run into Portland harbour of refuge, where they will ride in safety.

When the wind blows hard from the S.E. to the S.S.W., vessels in the Downs will be subject to the most danger, for those winds always drive in a heavy sea; there ships often ride very near each other; and the greatest strength of tide commonly happens at high water, when there is the most sea; besides, the anchorages in the Downs are so cut up by the anchors that the ground has become loosened, and consequently not very good for holding.

**CURRENTS, &c.**—A current of considerable strength frequently sets across the entrance of the Channel, at some distance from and westward of Ouessant and Scilly, in a N.W. and W.N.W. direction, the breadth and velocity of which is greatly dependent upon the wind most prevalent, and proportioned to its strength and direction; winds blowing from the West and S.W. quarters will be found very much to accelerate its force, and render it an object of serious attention. A strong S.W. wind constantly throws a great accumulation of water into the Channel, which tends greatly to increase the force of the flood-tide, while it as considerably retards the ebb, and augments the rise of the water fully 10 feet above its ordinary elevation; therefore, vessels having entered the Channel with a strong S.W. gale, are liable to be driven ahead of their

reckoning, and by taking the first of the flood, will have 10 or 11 hours tide, which, at 8 or 10 knots, will carry them from off the Start to Beachy head, or even so far as Dungeness.

In reference to the foregoing current it has been observed:—"It has long been known to mariners that a current constantly sets round capes Finisterre and Ortegal, into the Bay of Biscay; and it has been ascertained that, after a long and continued prevalence of westerly and southerly winds, the water, pent up in the bay, and impelled along its coasts, sets outward in a north-west direction, athwart the entrance of the Channel, although after a long interval of such winds it is almost imperceptible. This current has been found, after the wind had set strongly for some time from different points between South and West, to have had about 60 miles of westing and 12 miles of northing in its course, per day, in the most rapid part of its stream. The westerly current has appeared to extend from about 24 leagues W.S.W. of Scilly to more than  $3^{\circ}$  west of Cape Clear. It is, therefore, supposed to go off to the N.W. in the parallel of  $51^{\circ}$ , between longitudes  $14^{\circ}$  and  $15^{\circ}$ , and to the S.W. of Ireland, but its exact direction remains to be determined. The middle of the current appears to preserve its original course in a greater degree than its borders, and to set N.W. by W.; the eastern border more north, and the western more west, so that the northern current is much stronger close to the west of Scilly than further out. If a ship crosses the current obliquely, steering a true E. by S. course, or more southerly, she will continue in it longer, and be more affected by it, than if she steered more directly across it. It will be the same if she crosses it with light winds. Allowance must also be made for the more northerly direction of the eastern border.

"After a continuance of westerly gales, even should a good observation of latitude be made, it will be imprudent to run eastward during a long night; for a ship might remain in the current so long as to be drifted from a parallel, deemed a very safe one, to that of the rocks of Scilly. Therefore keep, at the highest, in  $48^{\circ} 45'$ ; for in  $49^{\circ} 30'$  the whole effect of the current may be experienced in the worst situation. But, from the current in  $48^{\circ} 45'$ , a southerly wind will send you into the Channel. In time of peace, coming from the Atlantic, it would be still better to make Ouessant. If it be admitted, as is suspected, that a tide with some degree of northing in it sets a little westward of Scilly, this is another reason for keeping far enough southerly. Ships bound westward from the Channel, with the wind near S.W., should prefer the port tack, as they would then have the benefit of the current."

**CHANNEL ISLANDS INDRAUGHT.**—Captain WHITE, R.N., observes, "The action of the indraught in the great bight between Normandy and Bretagne, on vessels bound up and down Channel, is by no means so universal as has been generally imagined. Between five hours' flood and low water (seven hours out of twelve), the whole body of water contained in the gulf between Cape La Hague and Brehat islands sets out thence north-westward, more northerly along the coast of Normandy, and more westerly along that of Bretagne; and the nearer you approach the islands, the stronger, of course, you will experience the indraught as well as the outset. But there is neither southing nor easting in the course of the tide, except between low water and five hours' flood. There is, therefore, no room for apprehension, except during that period, when the stream sets southerly, south-easterly, and easterly with great velocity; extending its influence between Guernsey and the Start, nearly half-channel over, and as far westward as the meridian of Ile de Bas."

**FOGS and MIRAGE.**—Fogs are frequent in all parts of the Channel, and they are formed both on the English and French coasts, in the valleys and low marshy lands, whence the winds drive them out to sea. In summer, they only hide the land in the morning, as they are readily dispersed by heat or a light breeze but the moist



haze driven in by westerly winds from the sea, is more tenacious, and only yields to strong winds. This haze always causes a short sea, and frequently turning to rain, brings bad weather.

In the eastern part of the channel, it is rare for the land to be completely free from vapours, unless previous to strong N.E. winds, when it may be distinctly seen from a great distance. The winds from the western quarter, as has been remarked, bring thick clouds, which frequently hide the land; and when it blows strong from the eastward, the vapours which cover the land are dense in proportion as the wind is strong and lasting.

Mirage is frequent on the French coast during the season of fine weather, and is considered an indication of fine weather when it only tends to enlarge the apparent size of objects; but at all seasons when it distorts them, so as to render them difficult of recognition, it is deemed to be a sign of rain, or strong easterly winds.

TIDES.—Off the mouth of the Channel the stream, although considerably influenced by the indraught and outset of the Channel, will be found running southward and westward, while the water is rising at Dover, and northward and eastward, while it is falling at that port. Southward of the parallel of Scilly, the tides of the Channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire round of the compass in one tide, without remaining long upon one point.

At Scilly it is high water at 4h. 42m. on the days of full and change. In running between these islands and the Lizard point, the set of the tide is of great importance, especially with southerly and south-westerly winds. Between the times of high and the succeeding low water, by the shore, the stream sets south-easterly, southerly, and south-westerly, or away from the Wolf; but from low to the following high water, it runs north-westerly, northerly, and north-easterly, or towards that rock. This peculiarity will be found within as upposed radius of 12 or 14 miles from the Wolf, whence, as you approach Scilly or the Lizard, the tides partake of the influence of the land.

In the fairway of the Channel, from the Lizard to the Isle of Wight, the flood sets East and E. by S., and the ebb West and W. by N.; from the Isle of Wight to Beachy head, the flood sets E.S.E., and the ebb W.N.W.; from Beachy head to Dungeness, the flood runs East and the ebb West. Off Dunnose in mid-channel, the stream of flood continues, on full and change days, till 10 $\frac{3}{4}$ h.

At the Lizard it is high water, full and change, at 5h.; at about 7 miles S.W. from the lights the flood and ebb streams on the days are nearly of equal duration, and run E. by S. and W. by N., the stream turning at 7h. 43m.

About 4 miles S.W. of the Eddystone, the stream on full and change begins to run E. by S. at 5h. 43m., and continues so till 8h. 20m., when it begins to slacken and shift southward. At 3 $\frac{3}{4}$  hours' ebb on the shore, that is about 9h. on full and change, it sets W.S.W.; at 4 hours' ebb, W. by N.; and then W.N.W. until low water. During the first two hours of flood on the shore, the stream sets N.W. by W., and in the next hour it slackens, running N.W. and North; it then runs E.N.E. and E. by N. till about high water, when it again sets E. by S. as at first.

It is high water at the Start at 6h. 10m. on the days of full and change. At the point and in the offing the stream makes westward 3 hours after high water by the shore, and eastward 3 hours after low water, the greatest velocity being at the time of high and low water, viz., 3 knots. When blowing fresh there is a strong race, both on the flood and ebb, from Start point to three quarters of a mile off shore.

At the Bill of Portland it is high water at full and change at 6 $\frac{3}{4}$ h. About a mile southward of the Bill, at half-flood by the shore, the tide sets from S.S.E. to S.E.  $\frac{1}{2}$  E. and the opposite stream about W.S.W.  $\frac{1}{2}$  W.; the rate of both at springs is from 5 to 6

knots; but although the tide runs with such violence near the Race (described on page 59), about a mile S.W. of the Bill the tide has been found very weak.

In Portland road there is very little tide, so that the stream is scarcely sensible. It is very moderate all the way from Weymouth to St. Alban's head.

If bound through the Needles channel great attention should be given to the remarks upon the tides given on page 52.

Nearly 5 miles S.S.E. from Dunnose (Isle of Wight), on full and change, the stream turns at 10h. 40m. and  $4\frac{1}{2}$ h., and runs E.  $\frac{1}{2}$  S. and W. by N., at the rate of from 4 to 5 knots. About 2 miles S.E. from the same point the flood sets E. by N., and turns at the same time as in Portsmouth harbour, and the ebb W. by S., but one hour earlier than in that harbour.

Having given a description of the tides near the most prominent points of the English shore as far up as Dunnose, we must refer the reader to pages 18 and 26, where remarks will be found upon the tides in the vicinity of the Owers, and between Beachy head and the Downs.

**SOUNDINGS IN LATITUDE  $49^{\circ} 25'$ .**—Vessels approaching the Channel from N.W. or West, should always endeavour to obtain soundings as early as possible, between latitudes  $49^{\circ} 15'$  and  $49^{\circ} 25'$ . In the latter parallel they will first strike soundings on the edge of the bank, in about longitude  $11^{\circ} 18' W.$ , when the depth will be from 159 to 335 fathoms, the ground a mixture of sand and ooze; when they get 90 to 86 fathoms on fine sand and ooze, they will be 10 leagues within the edge of the bank, and about 55 leagues westward of the meridian of Scilly. At 7 leagues further eastward the depth is 90 fathoms, sand and ooze, off the northern edge of the Great Sole bank. At 9 leagues further eastward, in the same parallel,  $49^{\circ} 25'$ , it is 81 fathoms, sand, or sand and ooze, and one league further 76 fathoms, sand and shells; this is 39 leagues W. by N. from St. Agnes light (Scilly). Proceeding eastward, at the distance of 3 leagues further, the depth will be 80 fathoms, sand, and at the end of another 3 leagues 83 fathoms, sand; the bottom thence continues of sand and ooze 9 leagues further eastward, one league beyond which is a depth of 78 fathoms, sand; this is in about longitude  $8^{\circ} W.$ , and 24 leagues West from St. Agnes light. Five miles further eastward, they will be on the eastern edge of the Haddock bank, where the depth is 60 fathoms, sand; having crossed which it increases to 75 and 70 fathoms, mud, and at the distance of 6 leagues further, decreases to 66 fathoms, sand and shells. In longitude  $7^{\circ}$ , upon the same parallel, there are also 66 fathoms water, sand and shell; continuing thence in the same direction to the distance of 9 leagues eastward there will be found 61, 64, 63, 61, and 63 fathoms, all brown and speckled sand with shells; the latter depth is on the meridian of Scilly; continuing eastward, 15 leagues further, there are 63, 62, 64, 61, 59, 58, and 55 fathoms, mostly sand; the latter depth being about the meridian of the Lizard.

Although there is a general impression that vessels should enter the English Channel between the parallels of  $49^{\circ} 15'$  and  $49^{\circ} 25' N.$ , some authorities consider such directions only applicable to vessels navigated by dead reckoning, or when the state of the weather prevents the actual position of the ship being ascertained; and even then they argue it is not the best track that could be chosen. First, because ships are obliged to make a more circuitous route from the Azores to get into the parallel of  $49^{\circ} 25' N.$  well westward of Cape Clear, than would be requisite in steering a direct course for the Lizard, and as S.W. or westerly winds prevail during a great part of the year, there can seldom be occasion to steer so far northward. Secondly, because in times of war enemies' cruisers frequently keep westward of Cape Clear, in latitude  $49^{\circ} 50' N.$ ; and they are generally best avoided by steering from the W.S.W. ward, a *direct* course into the English Channel. Thirdly, because ships, by keeping



on the parallel of  $49^{\circ} 25'$ , or  $49^{\circ} 30'$  N. have, when near the Scilly islands, frequently encountered sudden shifts of wind from southward, whereby they have been driven north-west of these islands into the Irish channel. From this cause many ships, forced to take shelter in Cork or some of the harbours on the coast of Ireland, have been detained long by southerly winds; whereas, by keeping a little further southward, the same winds would have been favourable for them entering and running up the English Channel. And fourthly, because when S.W. or southerly winds prevail, the flood-tide sets 8 or 9 hours northward into the Irish channel, and the ebb only 3 or 4 hours southward, by which ships taking the parallel of  $49^{\circ} 25'$ , or  $49^{\circ} 30'$  N., are liable to drift among, or northward of the Scilly islands during thick foggy weather, especially if the latitude is not known with precision.

**SOUNDINGS IN LATITUDE  $50^{\circ}$ .**—To the northward, or in the stream of Scilly, in latitude  $50^{\circ}$  N., or between it and  $50^{\circ} 10'$ , there are 101 fathoms water, on sandy bottom, in longitude  $10^{\circ} 53'$ ; this is 59 leagues westward of Scilly. Four leagues further eastward there are 84 fathoms, sand, and at 4 leagues still further, 72 and 73 fathoms; 3 leagues beyond which are 78 fathoms, all sand. In longitude  $9^{\circ} 50'$ , which is 3 leagues further eastward, there are 77 fathoms water, mud; hence the bottom is fine sand and ooze, with here and there a cast of sand and shells, to the distance of  $4\frac{1}{2}$  leagues from Scilly:—The depths are 72, 75, 74, and 61 fathoms—the last, being on the south-west edge of the West bank, in longitude  $8^{\circ} 39'$ ; four leagues further eastward there are only 55 fathoms water on it, and 4 miles still further 69 to 70 fathoms—close to its eastern edge; then comes 64, 75, 65, and 60 fathoms water—the last depth on the north-west bank, in latitude  $50^{\circ} 5'$ , longitude  $7^{\circ} 43'$  W., distant 17 leagues westward of Scilly. From this bank 62, 65, and 64 fathoms water will be found 9 leagues further eastward; the depth thence decreases from 61 to 58 fathoms, and subsequently to 53, 57, 50, and 46 fathoms, on coarse gravel and sand, which is within 4 miles of the Scilly rocks.

**JONES'S BANK.**—This bank lies between latitudes  $49^{\circ} 49'$  and  $49^{\circ} 57'$ , and longitudes  $7^{\circ} 47'$  and  $8^{\circ} 10'$ . It has from 39 to 60 fathoms water upon it, and close to its south and north sides is a depth of 68 to 72 fathoms. Its east end lies 18 leagues from St. Agnes lighthouse. The bottom is of fine and coarse grey and yellow sand, interspersed with brittle shelly substances, and minute yellow, reddish, angular stones, but the ground around is either mud or ooze. The tide causes rippings on all parts of this bank, particularly between 4 hours' ebb and high water.

**SOUNDINGS ROUND SCILLY.**—The bottom round the Scilly islands to the distance of  $4\frac{1}{2}$  leagues westward and 10 leagues southward and northward, consists of coarse gravel, shingles, rotten rocky substances, or sand; no mud is to be met with in all that space. Ten leagues southward from Scilly lighthouse the depth is 68 fathoms; at half that distance, in the same direction, 55 fathoms; and within 5 miles of the rocks, 54 fathoms. Ten leagues southward of St. Agnes lighthouse there are 58 or 60 fathoms water, on a spot known as the Admiralty patch, round which, in all directions, are 63, 64, and 65 fathoms, the bottom being mixed soundings and rather coarse sand; at 5 leagues from the lighthouse are depths of from 55 to 60 fathoms; at 4 leagues, 51 to 52 fathoms; and at 4 miles distance, in the same direction, 45 fathoms water, fine sand. There are 50 fathoms water at the distance of 5 leagues S.E.-ward from the lighthouse, and 45 fathoms at 4 miles. Six leagues N.W. from St. Agnes lighthouse are 57 fathoms water, and at 3 miles from the rocks in the same direction, 44 fathoms. Five leagues northward from St. Agnes lighthouse there are 47 fathoms water, and at 10 leagues 52 fathoms; N.E. from the lighthouse, distant 5 leagues, are 48 fathoms, and 2 miles from St. Martin's head, 42 fathoms. Within 2 miles eastward of the rocks there are also soundings of 42 fathoms.



**SOUNDINGS IN LATITUDE  $49^{\circ}$ .**—A little northward of this parallel, and in longitude  $11^{\circ}$ , there are 208 fathoms, sand and ooze; in  $10^{\circ} 53'$  there are 162 fathoms, mud; 5 miles further east are 93 and 85 fathoms, both mud; and in longitude  $10^{\circ} 42'$  W. begins the southern tract of sandy ground, which continues uninterrupted with mud or ooze all the way to the coast of France. On the parallel of  $49^{\circ}$ , in longitude  $10^{\circ} 12'$  W. there are 90 fathoms water; at 10 leagues further eastward 85 fathoms; 6 leagues beyond this, in longitude  $9^{\circ}$ , there are depths of 90 fathoms,—in succession then 86, 90, 87, 74, 75, 78, 75, 73, 72, and 70 fathoms,—the last depth in long.  $6^{\circ} 56'$  W. Continuing eastward there will be found depths 73, 70, 75, 73, 71, 66, 69, 67, 59, and 60 fathoms, in a space of 25 leagues, or as far as the meridian of Ouessant, the lead bringing up a pale whitish ground resembling hard marl, with a mealy surface.

**SOUNDINGS near the parallel of OUESSANT.**—In latitude  $48^{\circ} 24'$ , longitude  $9^{\circ} 30'$  (or 58 leagues westward of Ouessant), lies the western part of the Little Sole banks, which thence, in detached patches, extend north-eastward and eastward for a distance of 13 leagues. On the western part are depths of 84 fathoms, sandy bottom; and at 3 leagues further westward no bottom at 200 fathoms. These banks consist of several knolls, with from 65 to 89 fathoms water on them, and depths of 90 to 100 fathoms between them. Near the south part, in latitude  $48^{\circ} 15'$ , longitude  $9^{\circ} 7'$ , there are soundings in 160 fathoms, sand. In latitude  $48^{\circ} 23'$ , longitude  $8^{\circ} 34'$ , there are 100 fathoms, sand; 10 or 11 leagues further eastward, 92 fathoms, sand; then 87, 87, 85, 86, and 97 fathoms, all sand,—the last depth in a pit extending about 2 miles, in longitude  $7^{\circ} 34'$ . Thence, for a space of 24 leagues eastward, the depths are 87, 85, 86, 78, 72, 71, 68, and 66 fathoms, all sandy bottom,—the last depth being  $8\frac{1}{2}$  leagues westward of Ouessant. On the parallel of Ouessant, at 23 leagues from it, the depth is 85 fathoms, white sand; at 18 leagues, 75 fathoms; at 13 leagues, 68; and at 9 leagues, 66 fathoms, all sandy bottom; at 4 leagues it is 63; at 3 leagues, 65; and at less than 1 league, 50 fathoms. Approaching Ouessant, the sand becomes mixed with shells and bits of shells.

In dark, thick weather vessels should not approach Ouessant, or the Chaussée de Sein, into a less depth than 65 fathoms. In these parts the character of the bottom will vary, but mostly it will be found interspersed with small shells, resembling (and hence called) Hakes Teeth. Four leagues westward of Ouessant the depths are 59 and 60 fathoms, on pale whitish ground, resembling hardish marl, with mealy surface.

**DIRECTIONS.**—Perhaps the most eligible track for vessels bound to the English Channel is, after passing the Azores, to shape a direct course for the Lizard, inclining a little more to northward, as circumstances require. From January to May, when N.E. or northerly winds prevail outside, and in the entrance of the Channel, it will be proper to get into about  $49^{\circ}$  N. latitude, when the meridian of Cape Clear is approached; an easterly course for the Lizard ought then to be followed, and if the wind blows steady from northward, the parallel of  $49^{\circ} 30'$  may be preserved in passing Scilly islands. From April or May to November or December, S.W. and westerly winds commonly prevail; vessels may then steer to get into the latitude of  $48^{\circ}$  about the meridian of Cape Clear, and thence steer for the Lizard. But at all times vessels about to enter the Channel ought to act according to circumstances, by hauling either to northward or southward, as the wind renders it most advisable.

By following the above route, instead of going more northerly, vessels will save much time, and often escape the southerly gusts of wind which have frequently driven vessels north-westward of the Scilly islands, and even forced some to the harbours in Ireland, where they have been detained by the same winds that would have proved so favourable to a more southerly course; they will also have nothing to fear from the

current that sets towards the N.W. Ships, therefore, pursuing this track will probably get upon the Sole banks before mentioned, and can steer accordingly.

Having entered the Channel, it is not considered safe to keep over to the French shore, for the whole of that coast is fronted by sunken rock ledges; hence an approach to it just near enough to gain a view of the land from the masthead is sufficient. It is to be observed, that along that shore, and among the rocks and islands, the flood-tide, at the distance of 10 or 12 leagues from the land, sets S.E., while the ebb does not set N.W., but West alongshore, so that vessels driven on the coast with north-westerly gales will not have the tide to help them off, and will very probably be cast on shore. "Strangers," says M. DECHAMPS, "looking at the charts, will observe many inlets appearing like harbours sufficiently capacious to admit ships in case of distress or stormy weather; but this is an error, for there is no safe harbour, easy of access, on the whole coast of Brittany and Normandy, except in Guernsey and Jersey, where a vessel can take refuge, before they reach Cherbourg; while the opposite coast of England contains safe and commodious ports and roadsteads throughout." Ship-masters will easily know when they are too far southward by the coarseness of the ground, and the whirling of the tide, which frequently has the appearance of breakers; therefore, they should endeavour to keep upon the English coast, at from 15 to 20 miles distance, until they attain the vicinity of Portland.

After passing Scilly, continue running eastward for 10 or 11 leagues, but approaching the English shore not nearer than the depth of 53 or 54 fathoms, and getting no further southward than the depth of 60 fathoms. After having run this distance the Lizard will bear N.E., or N.E. by N., about 8 leagues, and the soundings will be from 53 to 55 or 56 fathoms, on sandy bottom with shells.

Ships entering the Channel ought always, if possible, to make the land about the Lizard; for should they afterwards have thick weather, they will then know how to steer, or how to advance up the Channel. Some, by neglecting this precaution, have, contrary to their expectation, got on the south side of the Channel. This error is greatly owing to the strong indraught between the islands of Guernsey and Jersey, and the coast of Brittany, which ought always to be guarded against, especially in thick weather. It frequently happens that ships bound to the Channel have not had an observation for some days, which, together with the operation of scant and contrary winds, and the setting of the tides, tends to perplex and bewilder the most experienced mariner, when thick weather prevents his getting a sight of the land.

SHIPS FROM SOUTHWARD, in thick weather and light winds, frequently get much to the northward of account, and fall into the Bristol channel or the N.W. of Scilly, which may be owing to the tide running 9 hours northward and only 3 hours southward. This unequal stream of tide begins about 14 leagues westward of Scilly. It first runs N.N.W., and continues to alter until it comes to the E.N.E.; the flood-tide then ceases to run. The flood runs here, on the full and change days, until 7h. 40m., at which time it is nearly half-ebb at the Scilly islands. The flowing of the tide is rather uncertain. About 7 leagues W.S.W. of Scilly it is known to flow till 4h. 25m., and in St. Mary's sound, Scilly, till 4h. 40m.

When bound to the Channel in the night, or in thick weather, do not at any time get nearer to Scilly than the depth of 60 fathoms, nor to the Lizard than 46 fathoms. Off the Lizard, in mid-channel, the stream of tide runs eastward, on full and change days, until 7h. 55m., or until it is half-ebb by the shore; it then changes, and runs westward, until it is half-flood by the shore. Two leagues outside the Lizard, the flood runs East, and the ebb West, but within that distance the flood runs southward of East, and the ebb northward of West.

When about 5 or 6 leagues southward of Scilly, the course to the same distance off the Lizard is E. by S.  $\frac{2}{3}$  S. 15 leagues; then haul in and make the land.

**LIZARD to START POINT.**—The course from the Lizard to Start point is E. by S.  $20\frac{1}{2}$  leagues. In running up go not into less water than 40 fathoms; for 35 fathoms is in the stream of the Eddystone.

Between the Lizard and the Eddystone, stand towards the shore in 40 fathoms, and off to 46. As the depth is 35 fathoms in the stream of the Eddystone, a vessel by keeping in deeper water will go clear of that danger. Abreast the Eddystone, in mid-channel, the flood runs eastward, on full and change days, until 8h. 30m.

Between the Eddystone and Start point, stand towards the shore into 32 fathoms, and off to 46. Within half a mile of Start point the depth is 15 fathoms. About 8 miles southward of Start point lies Start knoll, with 29 fathoms water on it, and 37 fathoms very near on both sides.

**START POINT to BEACHY HEAD.**—From Start point to Portland, the course is E.  $\frac{1}{3}$  S. (nearly), distance 16 leagues. Here run up between 30 fathoms in shore to 36 or 38 fathoms water to the southward, most part sand with shells; but if inwardly, in 26 or 25 fathoms, the bottom is ooze and sand.

By not standing further southward than into 36 fathoms, the strong indraught between the islands of Guernsey, Jersey, &c., will be avoided. Off the Bill of Portland, the flood runs eastward on the full and change days, until 10h. 15m. The course between Start point and Dunnose is E. by S. 32 leagues, with 30 to 32 fathoms water, as high as Portland; after which approach the shore not nearer than the depth of 25 fathoms, especially when above the high land of St. Albans, as with strong winds southerly, or in little winds, the tide of flood sets directly in for Christchurch, the Needles, and Freshwater bay. When standing towards the Isle of Wight, in thick weather and light winds, keep the lead going; neglect of this precaution has caused the loss of many a ship.

In running up from Dunnose to Beachy head, stand into 18 fathoms water, and without to not more than 30; off the Head the depth at 5 or 6 miles from the shore is 17 and 18 fathoms. The course up is E. by S., and distance 58 miles.

**BEACHY HEAD to SOUTH FORELAND.**—From Beachy head to Dungeness the bearing and distance are East  $9\frac{1}{2}$  leagues; but Beachy head must not be brought westward of N.W.  $\frac{3}{4}$  W. until 3 leagues eastward of it, in order to clear the Royal Sovereign shoals. When that distance has been run, or the town of Battle has been brought on with that of Bexhill, bearing about N.N.E., steer E.  $\frac{3}{4}$  N., about 8 leagues, for Dungeness. The depth is only 8 fathoms immediately southward of the Royal Sovereign shoals; it then increases to 12, 14, and 17 fathoms off Dungeness. When in the vicinity of those shoals, do not lessen the depth below 16 fathoms. From Dungeness to the South Foreland the course and distance are nearly E. by N.  $\frac{1}{2}$  N.  $6\frac{3}{4}$  leagues; keep no further off than into 16, nor closer in than 14 and 12 fathoms.

Ascending the Channel and abreast Start point, if the land has not been previously seen, endeavour to make the coast of England, to avoid the island of Alderney, the Casquets, &c.; but if this cannot safely be done, with a scant southerly wind, when the tide, both ebb and flood, has an inclination into every bay upon the coast, keep the lead constantly going, and if a cast be obtained in deep water, from 50 to 60 fathoms or more, coarse ground, the vessel will be somewhere near the stream of the Casquets, and it will be necessary to steer northward, into 40 or 35 fathoms, sand and shells.\*

The pit or gully, known as *Hurd's Dyke*, is an excellent guide to ships working up or down Channel in dark, hazy weather. In the west end of this dyke, at 4 leagues westward of, and in the parallel of the Casquets, the depth is 58 fathoms, coarse

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\* Being too far southward in the Channel (over to the coast of France), and mistaking the Casquet lights at first sight for those of Portland, has occasioned the loss of many ships upon the adjacent dangers.



ground; and within  $1\frac{1}{2}$  miles of it eastward and westward, 37 and 36 fathoms, sand. The gully extends thence to E.N.E. and E.S.-Eastward 10 leagues, and then takes a turn rather suddenly to N.N.E. more than 2 leagues, and is more than 2 miles wide. At 4 leagues from the west end soundings of 48 fathoms may be obtained; this is nearly 10 miles northward of the Casquets;—the depth is 45 fathoms northward, and 38 fathoms southward of it. N.E. by N. nearly 10 miles from the Casquets, are 72 fathoms water, coarse ground, and 39 fathoms, sand, southward. Further eastward there are 62, 54, and at its extremity 50 fathoms, all coarse ground; and northward and westward of it 10 fathoms less in every part; so that a ship from northward, increasing the depth 10 fathoms suddenly, may be assured of being within 10 miles of the Casquets, Alderney, or Cape La Hague.

The Casquets bear from the Start S.E.  $\frac{3}{4}$  S., 19 leagues, and from the bill of Portland S.S.W.  $\frac{2}{3}$  S. 16 leagues.

The depth south-westward, southward, and south-eastward of the Casquets within a radius of 3 leagues, does not materially differ from that in similar directions from Portland; hence it is possible in bad weather, under a combination of disadvantageous circumstances, for the former to be mistaken by a stranger for the latter, particularly if hazy weather prevent the revolving lights of the Casquets being distinguished, unless, indeed, soundings are accidentally obtained on a bank S.W. from the Casquets.

It must be recollected that there are six positions in which the three lighthouses on the Casquets appear as two only, the first of which is only removed about two points from the bearing of those on Portland; these positions are N.W.  $\frac{3}{4}$  W., or S.E.  $\frac{3}{4}$  E.; E.  $\frac{3}{4}$  N., or W.  $\frac{3}{4}$  S.; N.E.  $\frac{1}{2}$  E., or S.W.  $\frac{1}{2}$  W. from the lights respectively. Secondly, that the difference in the course from the Lizard, to those positions, is very trifling; and lastly, that this is the narrowest part of the Channel westward of Beachy head. A stranger therefore, may easily make an error, and such an error during the nights of winter, between the periods of low water and three-quarters flood, and with a gale of wind from between N.W. and S.W., would probably result in very serious consequences. This is a strong and unanswerable argument for constant attention to the lead, from the instant of first striking soundings; it is only by the use of the lead that such a mistake can be avoided.

By altering the courses successively between the meridians of the different headlands when advancing up Channel, the direct effects of the stream will be better counteracted. In the vicinity of Chesil beach the shore is low, whence the Peninsula of Portland suddenly rises and forms a very remarkable promontory, assuming the form of a wedge, and declining gradually southward; this promontory is everywhere rugged, and its eastern side presents the appearance of regular layers of masonry, even to its summit. Between Weymouth bay and St. Alban's head the shore is principally cliff, and consists for the most part of chalk, and from the latter to Peverel point of dark rock; thence its former elevation and chalky appearance continues as far as Old Harry, where it again abruptly declines. Throughout Christchurch bay the land is generally low, and still more so in the vicinity of Hurst castle, the base of which is very little above the sea.

The western end of the Isle of Wight, the Needles point, rises perpendicularly, and being composed wholly of chalk, has a remarkable appearance in contrast with the dark-coloured ground behind it. From the Needles eastward the land continues gradually to rise, until at Dunnose it attains its highest elevation; thence it declines towards Culver cliff, the eastern end of which, being also composed of chalk, is in great contrast with the land in its vicinity.

When standing towards the Isle of Wight, in thick weather and light winds, keep the lead going constantly, because from the depth of 22 fathoms a vessel may sud-

denly get into 18, and then 30 or 40 fathoms or more, within  $1\frac{1}{2}$  miles of St. Catherine's point. In standing off from the Isle of Wight, at about 6 leagues from the island, the depth will be found to increase rather suddenly from 30 or 33 fathoms to 39 or 40 fathoms: this is in the north side of the *Middle Deep*, which extends from abreast of Christchurch head to above Brighton, off which place it is known as the *North Deep*, at the distance of 5 to 6 leagues from the coast. It is of various breadth, from 2 to 5 leagues, and consists throughout of coarse ground; its depth is 4 to 10 fathoms greater than that existing between it and the land. By giving proper attention to these particulars, in thick weather, the distance from the English coast may be nearly ascertained. Its west end is 2 leagues eastward from the N.E. end of Hurd's Dyke, and its south edge is 6 or 7 leagues from cape Barfleur. Further eastward is the *South Deep*, in which are 32 to 36 fathoms water; between it and the North Deep soundings of 28 or 29 fathoms may be obtained.

Between Dunnose and the Elbow of the Owers stand towards the shore into 18 fathoms, and off to 30 fathoms. In light winds and thick weather it will be necessary to keep the lead going when standing towards the Owers.

In approaching the Owers lightvessel, do not bring it to bear further eastward than N.E. by E., nor go nearer to it in passing than  $1\frac{1}{2}$  miles.

If it be necessary to run into Selsea Park for shelter, with contrary winds, pass eastward of the lightvessel, and afterwards be sure not to bring it southward of S.W.  $\frac{1}{2}$  S.; keep the lead going, and when  $3\frac{3}{4}$  miles northward of it, steer westward for the anchorage in the Park.

Between the Owers and Beachy head, stand towards the shore into 18 fathoms, and off to 28 fathoms. The former depth will lead far enough off Beachy head to clear the shoals eastward of it.

Three leagues S.E.  $\frac{1}{2}$  S. from Beachy head is a knoll about 2 miles over, having 15 to 16 fathoms water on it, with from 26 to 33 fathoms close to its south side, 19 fathoms westward, and 17 fathoms eastward of it; it lies nearly a league southward of the Horse of Wellington, and the depth is 8 to 18 fathoms between them.

Between the shoals off Beachy head and Dungeness, stand towards the shore into 12 fathoms, and off to any convenient distance, according to circumstances, taking care not to go further from the land than 5 leagues, in order to avoid the Western Vergoyer, Boulogne Middle, &c. As the soundings hereabout are very irregular, we refer the mariner to the chart itself for the necessary information; observing only that, by not standing nearer the shore than into 12 fathoms, the shoals westward and eastward of the Ness point will be cleared.

Between Dungeness and the South Foreland, when eastward of the rocky shoal westward of Folkestone, stand towards the shore into 10 fathoms, and off to 16 fathoms. By not standing further off than into 16 fathoms, the Varne will be avoided.

When between Dover and the Downs, observe that if the depth of 17 fathoms be maintained, it will lead outside the South Sand-Head; 13 fathoms will lead within it; and 15 fathoms is in the stream of it.

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#### ON THE NAVIGATION OF THE CHANNEL BY STEAMERS.

It is of considerable importance that steamers running up and down Channel should avoid as much as possible the general track of sailing vessels, especially those of foreign trade, the navigation of which at night is frequently unattended with the necessary care. At all times, even when the greatest possible caution is taken, it requires an experienced eye, which is only to be found amongst those used to navigate shipping in the dark, to distinguish readily what a ship is about, how standing, &c., when sud-

denly coming upon her. Confusion in these cases is the usual consequence, and therefore steamers should keep a track only used by coasters and themselves, if possible.

From a position off the South Foreland, both lights in one, if passing pretty close under them, and then hauling in a little to pass near Dover, a W.S.W. course 21 miles will lead to Dungeness, just within the track of all large vessels running up. When outside Dungeness at a short distance, a W.  $\frac{1}{2}$  S. course, 30 miles, will lead to Beachy head, bearing North, distance 6 miles, passing outside the Royal Sovereign shoals, over which the depth sometimes is not more than 9 feet.

Beachy head light is badly placed for steam navigation, and to vessels from eastward is shut in so long, that it is impossible for a navigator wishing to keep in shore to know when it should be opened.

Beachy head may be passed as near as convenient, but with it bearing North, distant 6 miles, a course W. by N., 59 miles, will lead south of the Isle of Wight, with St. Catherine point light, bearing North, 8 miles. In this course the Owers with its light-vessel will be passed at a safe distance, but as the tide, both ebb and flow, has a tendency to set towards those shoals, care should be taken (if with spring tides especially, and fresh southerly breeze, the vessel be found nearer the light than the course steered should take her), to keep out a little, so as to give the Isle of Wight a fair berth. The Nab lightvessel also, if seen, which it will be if too far in, is also a good mark for St. Catherine point, which, on a dark night, should not be approached without great caution.

From the before-mentioned berth off St. Catherine point to a corresponding one off Start point, the direct course will be W.  $\frac{3}{4}$  N., 93 miles. During night, as soon as Portland lights are seen, it will be better to edge in a little towards them, and when abreast them, to make a corresponding allowance on the course for the Start, and thus continue the plan of keeping them well within the line of large ships ascending the Channel.

From the above position off Start point, a W.N.W. course, 54 miles, will lead to Falmouth, passing outside the Eddystone, from which the entrance to Falmouth is distant 29 miles. St. Anthony's light is a good revolving light, but is badly placed, being of no use to vessels approaching from eastward, as it remains shut in under St. Anthony's point, until the observer is close to it. The point on which the lighthouse is placed may be passed very close. Pilots pass it closely.

With Start point light bearing North 6 miles, the course and distance to a corresponding position off the Lizard lights, are W.  $\frac{2}{3}$  N., 64 miles. Thence southward of the Scilly islands W. by N.  $\frac{1}{2}$  N., 45 miles; or just southward of Wolf rock, N.W. by W.  $\frac{1}{4}$  W., 27 miles; or to the passage between Wolf rock and the Runnelstone (which is about 7 miles in width) N.W.  $\frac{1}{3}$  W., 25 miles. From these two latter positions a N.  $\frac{1}{2}$  W. course will lead out between the Longships and Seven stones.

THE COURSES up Channel, given as safe courses, are as follows:—

With St. Agnes light North, 8 miles, to Lizard lights North, 6 miles, E. by S.  $\frac{1}{2}$  S., 44 miles, and thence to off the Start, E.  $\frac{3}{4}$  S., 64 miles.

From Falmouth to off the Start, S.E. by E.  $\frac{3}{4}$  E., or E.S.E. in fine weather, 54 miles.

With the Start bearing true North to off Portland, East, 50 miles.

Off Portland lights to off Beachy head, E. by S.  $\frac{1}{4}$  S., 105 miles.

With Beachy head light N.N.W., 6 miles, the course is E.  $\frac{1}{2}$  N., about 30 miles to Dungeness.

Dungeness to South Foreland, about E. by N.  $\frac{3}{4}$  N., 21 miles.

Sailing eastward from Portsmouth, steer S.E. by S. from Nab lightvessel, in flood-tide; S.E. in ebb. The Owers lightvessel should be brought E. by S. before the course is altered.



## TABLE

OF

## MAGNETIC BEARINGS AND DISTANCES.

	Miles.		Miles.
North Foreland to East buoy of		Selsea Point . . . W.N.W. $\frac{1}{4}$ W.	39
Margate Sand . . . N. $\frac{1}{2}$ E.	4 $\frac{3}{4}$	Owers Lightvessel to Selsea Point	
Kentish Knock Lightvessel N.E. by E. $\frac{1}{4}$ E.	18	N.N.W.	6
Galloper Lightvessel N.E. by E. $\frac{1}{4}$ E.	29	Littlehampton . . . N.E. $\frac{1}{4}$ E.	10
Ostende . . . S.E. by E. $\frac{1}{2}$ E.	55	Shoreham . . . E. by N. $\frac{1}{4}$ N.	19
Dunkerque . . . S.E. $\frac{1}{2}$ S.	39	Newhaven . . . E. $\frac{1}{2}$ S.	29
N. Sand-Head Lightvessel . S.E. $\frac{1}{3}$ S.	6	Beachy Head . . . E. by S.	35
Gull Stream Lightvessel . S. by W.	6 $\frac{1}{2}$	Boulogne . . . E. by S. $\frac{1}{2}$ S.	84
South Foreland . . . S.S.W. $\frac{3}{8}$ W.	14	Etaples . . . S.E. by E. $\frac{3}{4}$ E.	84
South Foreland to North Foreland		St. Valery sur Somme . . S.E. E.	86
N.N.E. $\frac{2}{3}$ E.	14	Dieppe . . . S.E. $\frac{3}{4}$ S.	78
Dunkerque . . . S.E. by E. $\frac{1}{2}$ E.	37	St. Valery en Caux . . S.S.E. $\frac{1}{2}$ E.	62
Calais . . . S.E. $\frac{1}{2}$ S.	21	Fecamp . . . S. by E. $\frac{1}{2}$ E.	59
Cape Grisnez . . . S. $\frac{1}{2}$ E.	18	Cape La Heve . . . S. $\frac{1}{4}$ E.	73
Dieppe . . . S.S.W. $\frac{3}{8}$ W.	72	Island Marcouf Light . . S.W. $\frac{1}{2}$ S.	70
Dungeness . . . W.S.W. $\frac{1}{4}$ W.	20 $\frac{1}{2}$	Cape Barfleur Light . . S.W. $\frac{1}{4}$ S.	61
Dungeness to South Foreland		Cape La Hague . S.W. by W. $\frac{1}{2}$ W.	73
E.N.E. $\frac{1}{4}$ E.	20 $\frac{1}{2}$	Casquets Light . . . W. by S. $\frac{3}{4}$ S.	86
Ostende . . . E. $\frac{1}{2}$ S.	76	Start Point . . . W. $\frac{3}{4}$ N.	58
Dunkerque . . . E. by S.	54	St. Catherine's Point . . W. by N.	26
Calais . . . E. by S. $\frac{1}{2}$ S.	34	Nab Lightvessel to Owers Lightvessel	
Cape Grisnez . . . S.E. by E. $\frac{1}{2}$ E.	23	S.E. $\frac{1}{2}$ E.	16
Boulogne . . . S.E. $\frac{1}{4}$ S.	26	Dunnose . . . W.S.W. $\frac{1}{4}$ W.	7 $\frac{1}{2}$
Etaples . . . S.S.E. $\frac{1}{4}$ E.	32	Culver Cliff, W. Edge . . W. $\frac{3}{4}$ S.	3
S.W. ent. St. Valery sur Somme		Nettlestone Point, N.W. by W. $\frac{1}{4}$ W.	4 $\frac{1}{2}$
S. $\frac{1}{4}$ E.	48	St. Catherine Point to Owers Lightvessel	
Dieppe . . . S. by W. $\frac{1}{2}$ W.	60	E. by S.	26
St. Valery en Caux . . S.S.W. $\frac{1}{4}$ W.	63	Beachy Head . . . E. by S.	60
Fecamp . . . S.W. $\frac{1}{2}$ S.	72	Boulogne . . . E. by S. $\frac{1}{2}$ S.	110
Island Marcouf Light		Etaples . . . E.S.E.	110
S.W. by W. $\frac{3}{4}$ W.	116	St. Valery sur Somme . . S.E. by E.	105
Cape Barfleur Light . W. by S. $\frac{3}{4}$ S.	113	Treport . . . S. $\frac{1}{2}$ E. Easterly	104
Cape La Hague Light . . W. by S.	131	Dieppe . . . S.E. $\frac{1}{2}$ E.	98
Casquets Light . . . W. $\frac{3}{4}$ S.	148	St. Valery en Caux . . S.E. $\frac{1}{2}$ S.	86
Beachy Head Light . . . W. $\frac{1}{2}$ N.	29	Fecamp . . . S.E. by S. $\frac{1}{4}$ S.	78
Beachy Head to Dungeness . E. $\frac{1}{2}$ S.	29	Cape La Heve . . . S. by E. $\frac{1}{2}$ E.	82
Cape Grisnez . . . E. by S. $\frac{1}{2}$ S.	51	La Orne River . . . S. $\frac{1}{2}$ E.	86
Boulogne . . . E.S.E.	50	Island Marcouf . . . S. by W. $\frac{1}{2}$ W.	64
Etaples . . . S.E. $\frac{3}{4}$ E.	51	Cape Barfleur . . . S. by W. $\frac{3}{4}$ W.	52
St. Valery sur Somme . . S.E. $\frac{3}{4}$ S.	56	Cape La Hague . . . S.W.	55
Dieppe . . . S. by E.	58	Casquets Lights . S.W. by W. $\frac{1}{4}$ W.	65
Fecamp . . . S. by W. $\frac{1}{2}$ W.	58	Ouessant Light . . . W. by S. $\frac{3}{4}$ S.	189
Cape La Heve . . . S.S.W. $\frac{1}{4}$ W.	74	Start Point . . . W. $\frac{3}{4}$ N.	92
Island Marcouf Light. S.W. by W.	90	Portland Bill . . . W. by N. $\frac{1}{2}$ N.	45
Cape Barfleur Light, S.W. by W. $\frac{3}{8}$ W.	86	St. Alban's Head . . . W.N.W.	29
Cape La Hague . . . W.S.W. $\frac{1}{4}$ W.	104	Pool Harbour entrance N.W. $\frac{1}{2}$ W.	25
Casquets . . . W. by S.	119	Needles Point . . . N.W. $\frac{1}{4}$ N.	12
Start Point . . . W. $\frac{1}{2}$ N.	152	Bill of Portland to St. Alban's Head	
St. Catherine's Light . . W. by N.	60	E. $\frac{3}{8}$ S.	16
Owers Lightvessel . . . W. by N.	35	St. Catherine Light . E. by S. $\frac{1}{2}$ S.	44

MAGNETIC BEARINGS, &c.,—*continued*.

	Miles.		Miles.
Boulogne . . . . . E. by S. $\frac{1}{4}$ S.	154	Guernsey, S.W. end . . . S.E. $\frac{1}{2}$ E.	102
Etaples . . . . . E.S.E.	154	Sept Iles Light . . . S.S.E. $\frac{1}{8}$ E.	90
St. Valery sur Somme, S.E. by E. $\frac{1}{2}$ E.	152	Ile de Bas Light . . . S. by E.	82
Treport . . . . . S.E. by E. $\frac{1}{4}$ E.	149	Ouessant Light . . . S. by W. $\frac{3}{4}$ W.	89
Dieppe . . . . . S.E. $\frac{1}{4}$ E.	140	St. Agnes Light, Scilly, W. by N. $\frac{1}{2}$ N.	44
St. Valery en Caux . . . S.E. $\frac{1}{2}$ E.	124	Wolf Rock . . . W. by N. $\frac{3}{4}$ N.	23
Fecamp . . . . . S.E. $\frac{1}{8}$ E.	114	Seven Stones Lightvessel	
Cape La Heve . . . . . S.S.E. $\frac{1}{2}$ S.	114	N.W. by W. $\frac{1}{4}$ W.	36
La Orne River . . . . S.S.E. $\frac{1}{2}$ E.	112	Penzance Harbour . N.N.W. $\frac{3}{4}$ W.	16
Cape Barfleur . . . . S.S.E.	67		
Cherbourg . . . . . S. by E.	59	The Longships to Ile de Bas, S. by E. $\frac{3}{4}$ E.	100
Cape La Hague . . . . South	52	Ouessant . . . . . S. $\frac{3}{4}$ W.	96
Casquets Lights . . . S. by W. $\frac{1}{2}$ W.	48	Wolf Rock . . . . . S.W. $\frac{1}{4}$ S.	8
Sept Iles Light . . . . S.W.	107	St. Agnes Light, Scilly . . W. $\frac{1}{4}$ S.	25
Ile de Bas Light . . . . S.W. $\frac{1}{2}$ W.	121	Seven Stones Lightvessel W. by N. $\frac{3}{4}$ N.	13
Ouessant Light . . . S.W. by W. $\frac{1}{2}$ W.	157	Cape Clear, Ireland . . N.W. $\frac{3}{4}$ N.	167
Start Point . . . . . West	49	Old Head of Kinsale . . . N.N.W.	143
Berry Head . . . . . W. by N.	40	Cork Harbour Light . N. by W. $\frac{1}{2}$ W.	144
Exmouth Bar . . . . N.W. by W. $\frac{1}{2}$ W.	35	Hook Light off Waterford . N. $\frac{1}{2}$ E.	131
Start Point to Lyme Regis		Saltees Lightvessel . . . N.E. $\frac{3}{4}$ E.	124
N.E. by E. $\frac{3}{4}$ E.	39	Tuskar Light . . . N. by E. $\frac{1}{2}$ E.	130
Bill of Portland . . . . East	49	Smalls Light . . . N.N.E. $\frac{1}{2}$ E.	100
St. Alban's Head . . . . E. $\frac{1}{4}$ S.	64	St. Ann's Light, Milford N.E. $\frac{3}{4}$ N.	99
St. Catherine's Point . . E. $\frac{3}{4}$ S.	92	St. Agnes Light, Scilly, to Longships	
Owers Lightvessel. E. $\frac{3}{4}$ S. southerly	116	Light . . . . . E. $\frac{1}{4}$ N.	25
Beachy Head . . . . . E. $\frac{7}{8}$ S.	152	Wolf Rock . . . . . E. by S.	21
Cape La Heve . . . . . S.E. $\frac{1}{2}$ E.	146	Lizard Lights . . . . E. by S. $\frac{1}{2}$ S.	44
Cape Barfleur . . . . S.E. easterly	96	Casquets Lights . . . S.E. by E. $\frac{3}{4}$ E.	153
Cape La Hague . . . . S.E. $\frac{1}{4}$ S.	73	Guernsey Island . . . S.E. by E. $\frac{1}{4}$ E.	145
Casquets Lights . . . . S.E. $\frac{1}{4}$ S.	54	Sept Iles Light . . . . S.E. $\frac{1}{2}$ S.	125
Guernsey, W., point of, S. by E. $\frac{1}{2}$ E.	56	Ile de Bas . . . . . S.S.E. $\frac{1}{2}$ E.	112
Sept Iles Light . . . S. by W. $\frac{1}{2}$ W.	74	Ouessant . . . . . S. $\frac{3}{2}$ E.	96
Ile de Bas Light . . . S.S.W. $\frac{3}{4}$ W.	84		
Ouessant Light . . . . S.W. $\frac{1}{2}$ W.	117	Cape Cornwall to Scilly	
Lizard Lights . . . . . W. $\frac{3}{8}$ N.	62	N. point of, W. $\frac{1}{4}$ N.	26
Eddystone Light to Lizard Lights		Seven Stones Lightvessel . W. $\frac{3}{4}$ N.	13
W. $\frac{1}{4}$ N.	38	Mizen Head, Ireland . . N.W. $\frac{1}{2}$ N.	176
Falmouth Light . . . W. by N. $\frac{1}{2}$ N.	30	Cape Clear Light . . . N.W. $\frac{1}{2}$ N.	164
Dodman Point . . . N.W. by W. $\frac{1}{2}$ W.	22	Old Head of Kinsale . N.N.W. $\frac{1}{4}$ W.	140
Fowey . . . . . N.W. $\frac{1}{2}$ N.	18	Cork Harbour entrance, N. by W. $\frac{3}{4}$ W.	140
Looe . . . . . N. by W.	12	Waterford Harbour, Hook Light	
Rame Head . . . . . N.N.E. $\frac{3}{4}$ E.	8 $\frac{1}{2}$	N. $\frac{1}{4}$ E.	123
Plymouth Breakwater Light . N.E.	10	Saltees Lightvessel . . . N. $\frac{3}{4}$ E.	120
Bolt Head . . . . . E. $\frac{1}{4}$ S.	18	Tuskar Light . . . N. by E. $\frac{1}{2}$ E.	130
Prawl Point . . . . . E. by S. $\frac{1}{2}$ S.	20 $\frac{1}{2}$	Smalls Light . . . N.N.E. $\frac{1}{4}$ E.	99
The Lizard to Rame Head . E. $\frac{5}{8}$ N.	44	St. Ann's Light, Milford N.E. $\frac{1}{4}$ N.	99
Eddystone Light . . . . E. $\frac{1}{4}$ S.	38	Caldy Island Light. . . N.E. $\frac{1}{4}$ E.	100
Start Point Light . . . . E. $\frac{3}{4}$ S.	62	Lundy Island Light . . N.E. by E.	75
Casquets Lights . . . S.E. by E. $\frac{1}{2}$ E.	108	Hartland Point . . . N.E. by E. $\frac{3}{4}$ E.	71
		Treose Head . . . E. by N. $\frac{3}{4}$ N.	36

# LIFE-BOAT STATIONS ON THE SOUTH COAST OF ENGLAND.

KENT . . . .	Margate.	DORSET . . . .	Weymouth.
	Kingsgate.		Lyme Regis.
	Broadstairs.	SOUTH DEVON .	Sidmouth.
	Ramsgate.		Exmouth.
	North Deal.		Teignmouth.
	Walmer.		Brixham.
	Kingsdowne.		Salcombe.
	Dover.		Plymouth.
	Dungeness.	CORNWALL . . .	Looe.
SUSSEX . . . .	Rye.		Fowey.
	Winchelsea.		Mevagissey.
	Hastings.		Porthlooe.
	Eastbourne.		Falmouth.
	Newhaven.		Porthoustock.
	Brighton.		Cadgwith.
	Shoreham.		Lizard.
	Worthing.		Mullion.
	Selsea.		Porthleven.
	Chichester Harbour.		Penzance.
HAMPSHIRE . .	Hayling Island.		Sennen Cove.
ISLE OF WIGHT.	Bembridge.		St. Ives.
	Brighstone Grange.		Hayle.
	Brooke.		New Key.
DORSET . . . .	Poole.		Padstow.
	Chapman's Poole.		Port Isaac.
	Kimmeridge.		Bude Haven.

## BUOYS, &c.

The following is the system of Buoyage followed in all waters under control of the Trinity House Corporation:—

The side of the Channel is considered Starboard, or Port, with reference to the entrance to any Port from seaward.

The entrances of Channels, or turning points, are marked by *spiral* buoys with or without staff and globe, or triangle, cage, &c.

*Single-coloured can* buoys, either *black* or *red*, mark the starboard side, and buoys of the same shape and colour either *chequered* or *vertically striped with white*, the port side: further distinction is given when required by the use of spiral buoys, with or without staff and globe, or cage: globes being on the starboard hand, and cages on the port hand.

Where a middle ground exists in a channel, each end of it is marked by a buoy of the colour in use in that channel but with annular bands of white, and with or without staff and diamond or triangle as may be desirable: in the event of its being of such extent as to require intermediate buoys, they are coloured as if on the sides of a channel. When required, the outer buoy is marked by a staff and diamond, and the inner one by a staff and triangle.

Wrecks are marked by *green Nun* buoys.



## TABLE OF GEOGRAPHICAL POSITIONS.

	Latitude.			Longitude.		
	°	'	"	°	'	"
North Foreland; lighthouse . . . . .	51	22	28N	1	26	48E
Ramsgate; lighthouse on west pier . . . . .	51	19	42	1	25	23
North Sand head; lightvessel . . . . .	51	19	23	1	35	27
Deal Castle; centre . . . . .	51	13	9	1	24	20
South Foreland; lighthouses . . . . .	51	8	23	1	22	22
Dover; castle . . . . .	51	7	45	1	19	22
Varne shoal; lightvessel . . . . .	50	56	18	1	16	20
Folkestone; lighthouse . . . . .	51	4	45	1	11	35
Dungeness; lighthouse . . . . .	50	54	47	0	58	18
Beachy head; lighthouse . . . . .	50	44	15	0	12	58
Newhaven; west pier-head . . . . .	50	47	0	0	3	25
Brighton; pier-head . . . . .	50	49	0	0	8	0W
Owers shoals; lightvessel . . . . .	50	38	50	0	40	0
Portsmouth harbour; semaphore in dockyard . . . . .	50	48	0	1	6	15
St. Catherine point; lighthouse . . . . .	50	34	30	1	17	47
Needles rocks; lighthouse . . . . .	50	39	40	1	35	27
Poole; church . . . . .	50	42	46	1	59	18
St. Alban's head; extreme . . . . .	50	34	30	2	3	10
Weymouth; beacon on pier-head . . . . .	50	36	23	2	26	20
Bill of Portland; upper lighthouse . . . . .	50	31	18	2	27	18
Exmouth; church . . . . .	50	37	0	3	24	40
Teignmouth; lighthouse on Denn . . . . .	50	32	35	3	29	36
Torquay; lighthouse on pier-head . . . . .	50	27	30	3	31	0
Berry head; summit . . . . .	50	23	56	3	28	56
Dartmouth; St. Petrox church . . . . .	50	20	30	3	33	55
Start point; lighthouse . . . . .	50	13	18	3	38	28
Bolt head; summit . . . . .	50	13	10	3	48	45
Plymouth Sound; signal staff (Mount Wise) . . . . .	50	22	0	4	10	15
"    "    dial on breakwater . . . . .	50	19	59	4	8	52
Eddystone rock; lighthouse . . . . .	50	10	49	4	15	53
Rame head; extreme . . . . .	50	18	42	4	13	22
Looe Island; summit . . . . .	50	20	17	4	27	0
Gribbin head; beacon . . . . .	50	19	0	4	40	20
Dodman point; extreme . . . . .	50	13	15	4	48	2
Falmouth; turret of Pendennis castle . . . . .	50	8	44	5	2	45
Lizard head; eastern lighthouse . . . . .	49	57	34	5	12	4
Mount St. Michael; summit . . . . .	50	7	3	5	28	37
Runnelstone; summit . . . . .	50	1	26	5	40	18
Wolf rock; lighthouse . . . . .	49	56	41	5	48	30
Seven Stones; lightvessel . . . . .	50	3	10	6	7	20
St. Agnes island (Scilly); lighthouse . . . . .	49	53	31	6	20	41
Bishop rock; lighthouse . . . . .	49	52	30	6	26	36
Longships rocks; lighthouse . . . . .	50	3	58	5	44	44
St. Ives; lighthouse on pier-head . . . . .	50	12	0	5	28	0
Godrevy island; lighthouse . . . . .	50	14	0	5	24	0
Trevoze head; lighthouse . . . . .	50	32	55	5	2	3

SAILING DIRECTIONS  
FOR THE  
ENGLISH CHANNEL.

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PART II.

THE NORTH COAST OF FRANCE.

## ADDENDA.

**RIVER SEINE.**—The following regulations were established in 1868, and may still be in force :—

**Havre.**—Fires in steamers and sailing vessels are permitted only from 8h. *a.m.* to 5h. *p.m.* in winter; from 5h. *a.m.* to 8h. *p.m.* in summer. Lights must be extinguished at latest at 8h. *p.m.* in winter; at 9h. *p.m.* in summer. Steamers leaving at daybreak are allowed to light the fires three hours before departure.

The time allowed for loading and unloading vessels is as follows :—

SAILING VESSELS.			STEAMERS.		
	Unloading.	Loading.		Unloading.	Loading.
150 tons and under	2 days	3 days.	150 tons and under	5 days	10 days.
151 to 300 . . . .	4 „	5 „	151 to 300 . . . .	7 „	14 „
301 to 500 . . . .	6 „	7 „	301 to 500 . . . .	9 „	17 „
501 to 750 . . . .	8 „	9 „	501 to 750 . . . .	11 „	20 „
751 to 1000 . . . .	10 „	11 „	751 to 1000 . . . .	12 „	23 „
1001 to 1250 . . . .	12 „	13 „	1001 to 1250 . . . .	15 „	25 „
1251 to 1500 . . . .	14 „	15 „	1251 to 1500 . . . .	17 „	27 „
1501 and upwards . .	16 „	17 „	1501 and upwards . .	20 „	30 „

**Honfleur.**—A red flag hoisted on the signal-mast of the eastern pier indicates that no vessel can enter the port; a blue streamer at the head of the special signal-mast of the same pier prohibits vessels leaving. A vessel moving in the docks or port must display its flag.

**Rouen.**—A vessel entering or leaving must display its flag. Vessels of 100 tons and under are allowed 5 days to *unload*; of 101 to 200 tons, 10 days; of 201 tons and upwards, 12 days. Vessels *loading* are allowed 10 days, if of 100 to 150 tons; 12 days if of 151 to 200 tons; and if of 201 tons and upwards, 15 days.

**CHANNEL ISLANDS.**—The following beacons have been erected on dangers near Herm island; also a provisional light is exhibited at St. Peter Port, Guernsey, viz. :—

1. **Grande Amfroque**, north-east from Herm :—Two conical stone beacon towers have been erected, the easternmost is 35 feet above the rock, and painted *black* and *white in horizontal bands*, the westernmost is 20 feet high, and painted *white*. Both are surmounted by a staff and ball, and the eastern beacon has a horizontal bar near the summit, which is seen between the bearings S.W. to S.E.

2. **Tautenay**, north of Herm, a beacon tower, 22 feet high, painted in *black* and *white vertical stripes*, and surmounted by a staff.

*Note.*—This beacon in line with Doyle's column, Guernsey, will lead  $1\frac{1}{2}$  cables west of Platte boue, and when at the same distance to the northward of Platte boue the two beacons on the Grande Amfroque will be in line.

3. The buoy marking the Platte boue rock has been *removed*.

4. **St. Peter Port, Guernsey.**—A round tower is in the course of erection on the extremity of the northern jetty, and provisionally, until the tower is finished, a *fixed green* light is exhibited from a lamp-post at the end of the jetty. *Variation*,  $20^{\circ}$  *W.* (1873.)



# P R E F A C E

TO

## PART II.

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THIS work,—a Nautical Description of the north coast of France, westward of Cape Grisnez,—has been compiled from various sources of information, but chiefly from surveys made by order of the French Government. The portion included within the British dominions—the Channel Islands—is from English surveys, and in its compilation we have extracted largely from the “Channel Islands Pilot,” by Staff-Commander John Richards, R.N., which (with the accompanying charts) is the result of the examination and thorough exploration of the islands conducted by Commander F. Sidney, R.N., and himself during the years 1859 to 1867: we recommend shipmasters, having occasion to visit any of these islands, to provide themselves with this excellent “Directory,” and the charts of which it is the explanatory memoir.

Although considerable pains have been bestowed in the selection and arrangement of the materials from which our compilation was made, it must be remembered that most of the rivers and harbours on the north coast of France are so subject to changes in the depth and direction of their navigable channels, that a prudent shipmaster should always employ a pilot unless he has a good knowledge of the port, harbour, or river to which or from which he is bound. We have added in the Appendix some remarks upon the manner in which the sands are buoyed; hence, if careful attention be paid to the “system” there described, little difficulty should be experienced even when a pilot does not offer his services.

It remains now to be added that the longitudes are dependent upon Paris Observatory, which is considered to be  $2^{\circ} 20' 9''$  E. from Greenwich.

As from the nature of the subject it is impossible that a work purporting to be a “Sailing Directory” can be, or can remain any length of time, free from error, it is respectfully requested that any faults that may be detected in this publication be notified to the publishers, who will very thankfully receive communications tending to its improvement.

J. F. I.

LONDON, *January*, 1874.

## LIGHTS.

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The following is a complete list of the Lights shown at this date, *January 1st, 1874*, within the limits of the Navigation described in this work (Part II.). As a full description of them is given in the pages mentioned, it is unnecessary to add more detailed particulars :—

Those with \* attached to them are stations for Lifeboats or Life-saving apparatus.

### CAPE GRISNEZ TO CAPE LA HAGUE.

	PAGE
Cape Grisnez . . . . .	<i>Revolves</i> in 30 seconds (electric light); visible about 22 miles . . . . . 137
Boulogne . . . . .	Two tidal lights on south-west jetty; visible 9 miles. A <i>red fixed</i> light on the north-east jetty; visible 7 miles* . . . . . 140
Cape Alprech . . . . .	<i>Fixed</i> (with a <i>red flash</i> every 2 minutes); visible 12 miles . . . . . 142
River Canche . . . . .	On point Lornel (the north shore) a <i>fixed</i> light; visible 6 miles. On point Touquet (the south shore) two <i>fixed</i> lights; visible 20 miles. <i>If two fixed lights are subsequently shown at the bay of Etaples (as proposed) the light on point Lornel will be discontinued</i> . . . . . 143
Point Haut Banc . . . . .	A <i>fixed</i> light, with <i>eclipses</i> every 6 seconds; visible 14 miles* . . . . . 143
River Somme . . . . .	Near Cayeux a <i>fixed</i> light (with a <i>flash</i> every 4 minutes); visible 14 miles,—also a tidal light; visible 6 miles. At Hourdel point a tidal light; visible 6 miles. A small <i>red fixed</i> light on the dike at St. Valery; visible 10 miles. And a tidal light at Crotoy, on the north bank of the river; visible 6 miles . . . . . 144
Treport . . . . .	A <i>fixed red</i> light on the east jetty; visible 5 miles. Also, a <i>fixed</i> (tidal) light on the west jetty; visible 10 miles . . . . . 144
Dieppe . . . . .	A <i>fixed</i> (tidal) light on the west jetty; visible 10 miles. Also various other lights* . . . . . 145
Point d'Ailly . . . . .	<i>Revolves</i> in one minute; visible 27 miles . . . . . 145
St. Valery-en-Caux . . . . .	A <i>fixed red</i> light on the east jetty; visible 5 miles. Also, a <i>fixed</i> light (tidal) on the west jetty; visible 6 miles . . . . . 146
Point Fagnet . . . . .	A <i>fixed</i> light; visible 18 miles . . . . . 146
Fecamp . . . . .	A <i>fixed</i> tidal light (with a <i>flash</i> every 3 minutes) on the north jetty; visible 10 miles. Also, a small <i>red</i> light on the south jetty; visible 5 miles* . . . . . 146

		PAGE
Cape La Hève . . . . .	Two <i>fixed</i> electric lights; visible 27 miles . . . . .	147
Havre . . . . .	A <i>fixed</i> light on the north-west jetty; visible 10 miles. Also, a light ( <i>orange</i> colour) on the south jetty; visible 1 to 5 miles* . . . . .	147
River Seine . . . . .	Various lights . . . . .	149
Trouville . . . . .	Various lights; visible 6 miles* . . . . .	150
Dives . . . . .	Two <i>fixed red</i> lights, one of which is shown only at tide time; visible 7 to 9 miles . . . . .	150
River Orne . . . . .	A <i>fixed</i> light on Oyestreham church; visible 10 miles. Also other lights . . . . .	151
Courceulles . . . . .	A small <i>fixed</i> light on the west jetty; visible 6 miles . . . . .	151
Point de Ver. . . . .	A <i>fixed</i> light (flashing every 4 minutes); visible 14 miles . . . . .	151
Port en Bessin . . . . .	A <i>fixed</i> light on the west cliffs, visible 6 miles.* Also, a <i>fixed</i> light which is shown only at tide time, when it illuminates an arc of 30° (15° on each side of the centre of the channel); visible 12 miles; when the depth in the interior of the port is 11 feet and upwards it changes to <i>red</i> , and is then visible only 9 miles. The two lights in one lead in . . . . .	151
Grandchamp . . . . .	A <i>fixed</i> light; visible 6 miles . . . . .	151
Isigny . . . . .	Two <i>fixed</i> lights; visible 12 miles. Shown over an arc of 30° (15° on each side of the centre of the channel) . . . . .	152
Carentan . . . . .	Two <i>fixed</i> lights (one of which is <i>red</i> ); visible 7 miles . . . . .	152
St. Marcouf . . . . .	<i>Fixed</i> ; visible 8 to 10 miles . . . . .	152
Fort La Hougue, &c. . . . .	<i>Fixed</i> ; visible 9 miles. Various other lights . . . . .	152
Barfleur . . . . .	Two <i>fixed</i> lights: visible 10 miles* . . . . .	154
Cape Barfleur . . . . .	<i>Revolves</i> in 30 seconds; visible 22 miles . . . . .	154
Cape Levi. . . . .	<i>Fixed</i> (a <i>red</i> flash every 3 minutes); visible 12 miles . . . . .	157
Becquet . . . . .	Two small <i>fixed</i> lights, the inner of which is <i>red</i> ; visible 7 to 9 miles* . . . . .	157
Cherbourg . . . . .	<i>Fixed</i> , on Pelée island; visible 9 miles;—a <i>fixed red</i> light on the end of the eastern jetty; visible over the greater part of the harbour;—and a <i>fixed</i> light in fort Querqueville; visible 10 miles. A small <i>green</i> light is shown on the east end, and a <i>red</i> light on the west end* of the breakwater; these are visible 4 to 7 miles. Also, a <i>fixed</i> light ( <i>flashing</i> every 3 minutes) at fort Central (in the middle of the breakwater), visible 10 miles . . . . .	157–160
Cape La Hague . . . . .	<i>Fixed</i> , on Gros du Raz rock; visible 18 miles. Lifeboat station at Goury . . . . .	162

## ALDERNEY, THE CASQUETS, GUERNSEY AND JERSEY.

Alderney . . . . .	Two <i>fixed red</i> lights, at Braye; visible 8 or 9 miles. Lifeboat station at St. Anne . . . . .	165
Casquets . . . . .	Three lights <i>revolving</i> every 20 seconds; visible 16 miles . . . . .	167



		PAGE
Guernsey . . . . .	On the Hanois rocks, a <i>red</i> light revolving every 45 seconds; visible 12 to 14 miles . . . . .	169
„ . . . . .	At St. Peter Port, a <i>fixed</i> light on the end of Castle Cornet breakwater; visible 9 miles;—also a small <i>fixed red</i> light on the south pier-head of the old harbour. Lifeboat station at St. Sampson . . . . .	171
Jersey . . . . .	Various lights at St. Helier. A <i>fixed</i> light on the pier in Grouville bay; visible 4 miles. Also, a <i>fixed</i> light on the end of the breakwater in St. Catherine bay; visible 7 to 10 miles . . . . .	184 to 186

## BANKS AND ISLETS BETWEEN JERSEY AND FRANCE.

Minquiers . . . . .	A <i>Lightvessel</i> showing two <i>fixed</i> lights; visible 8 to 10 miles. A fog bell . . . . .	192
Chausey Islets . . . . .	<i>Fixed</i> (with a <i>red flash</i> every 4 minutes); visible 15 miles* . . . . .	192

## CAPE LA HAGUE TO OUESSANT ISLAND.

Dielette . . . . .	Two small <i>fixed</i> lights; visible 5 to 9 miles,—that at the head of the port is coloured <i>red</i> , and shown over an arc of 30° (15° on each side of the centre of the channel)* . . . . .	194
Cape Carteret . . . . .	<i>Revolves</i> in 30 seconds; visible 18 to 20 miles* . . . . .	194
Port Bail . . . . .	Two small <i>fixed</i> lights; visible 5 to 9 miles, that at the head of the port is coloured <i>red</i> , and shown over an arc of 30° (15° on each side of the centre of the channel)* . . . . .	196
Senequet Rocks . . . . .	<i>Fixed red</i> ; visible 10 miles . . . . .	196
Regneville . . . . .	<i>Fixed</i> , on Agon point; visible 10 miles . . . . .	196
Granville . . . . .	<i>Fixed</i> ; visible 14 miles. Also, a small <i>red</i> light on the head of the mole* . . . . .	197
Mont St. Michel . . . . .	<i>Red</i> tidal light; visible 6 miles . . . . .	198
Houle-sous-Cancale . . . . .	<i>Fixed red</i> , on Fenetre rock; visible 7 miles . . . . .	198
Herpin Rock . . . . .	In lat. 48° 43 $\frac{1}{4}$ ' N., long. 1° 49 $\frac{1}{2}$ ' W. <i>Proposed</i> . . . . .	199
Bay of St. Malo . . . . .	Various lights; of which the outermost <i>flashes red</i> and <i>green</i> and is visible 12 miles* . . . . .	200
Cape Frehel . . . . .	<i>Revolves</i> in 30 seconds; visible 24 miles. A lifeboat station at Pléherel . . . . .	204
Légue (St. Brieuc) . . . . .	<i>Fixed</i> ; visible 10 miles . . . . .	205
Binic . . . . .	<i>Fixed</i> ; visible 10 miles . . . . .	205
Portrieux . . . . .	<i>Fixed red</i> , on the jetty; visible 7 miles* . . . . .	206
St. Quay Islands . . . . .	<i>Fixed</i> , on Harbour Island; visible 10 miles . . . . .	206
Roches Douvres . . . . .	<i>Scintillating</i> ; visible 25 miles, the eclipse (continuing 3 seconds) occurs every 5 seconds . . . . .	206
Brehat Island . . . . .	Two <i>red fixed</i> lights, of which the inner illuminates an arc of 30° (15° on each side of the centre of the channel); visible 7 to 9 miles* . . . . .	205
Heaux de Brehat . . . . .	<i>Fixed</i> ; visible 18 miles . . . . .	208
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# SAILING DIRECTIONS

FOR THE

## ENGLISH CHANNEL.

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\* \* *The Bearings and Courses throughout this Work are Magnetic, unless otherwise expressed.*

*The Variation at present (1873) is 18° 30' W. at Cape Grisnez; 19° 45' W. at Cherbourg (which may be considered the middle of the Channel); and 21° W. at Ouessant Island. It is estimated to decrease 10' annually.*

*The Distances are in Nautical Miles,—60 to a Degree of Latitude.*

*A Cable is considered to be  $\frac{1}{10}$  of a Nautical Mile, and equal to 100 Fathoms.*

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## PART II.

### NORTH COAST OF FRANCE.

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#### CAPE GRISNEZ TO CAPE LA HAGUE.

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**CAPE GRISNEZ and LIGHT.**—Cape Grisnez is one of the most remarkable headlands on the northern coast of France; its height is about 150 feet, and it can be seen in clear weather at the distance of 14 miles. The steep, abrupt, perpendicular rocky coast of which it consists is of a white or greyish colour, and has rather a purple appearance when the sun shines on it. At the foot of the cape are some rocks, and a rocky bank partly covered with sand. Upon the summit of the cape there is a small battery, and also a lighthouse.

The lighthouse is 79 feet high, and shows a brilliant electric *revolving* light at 226 feet above high water, visible in clear weather 22 miles. The period of revolution is 30 seconds. This light should not, therefore, be mistaken for the intermitting light at Calais, as that light shows a flash every 4 minutes (the flash being preceded and followed by short eclipses), nor should it be taken for Alprech point light southward of cape Grisnez, which is varied by a red flash every 2 minutes.

*St. John's Road*, a short distance southward of cape Grisnez, is an anchorage in which vessels occasionally remain for a short time, protection being afforded from the E.N.E., East, and S.E. winds by the high land of the cape. The depth is 9 to 15 fathoms, and it is recommended not to approach the land too closely, or there may be some difficulty experienced in getting under way if the wind begin to blow strongly from the S.W., West, or N.W.; with these winds there is very bad riding and a rough



sea; it should also be remembered that they blow directly on shore. The best mark is said to be Ambleteuse tower kept in sight between the houses. The ground around the shore, for about a quarter of a mile out, is foul and rocky, and no vessel should anchor in less water than 10 or 9 fathoms.

From cape Grisnez to Ambleteuse the distance is about 4 miles, and the land gradually decreases in height. For about  $1\frac{1}{4}$  miles of this distance, or as far as point Riden, the cliffs are perpendicular and uniform, and this part is almost as high as the land about cape Alprech, being so elevated that it can be seen nearly 15 miles off. Hence to Audrecelles (a little village on the shore near Ambleteuse, and conspicuous by its fort, church, and windmill) the land consists of little hills separated by valleys running East and West, and the coast is composed of rocky cliffs or fallen rocks.

**Ambleteuse Road.**—Ambleteuse is easily recognised. The village is in an amphitheatre on the northern side of the port, and has a mill a little north of it; on the shore side there is also a fort. The harbour of Ambleteuse has been completely abandoned, being scarcely able to afford shelter to the smallest vessels. The piers and quays are in ruins; some of the materials were used in the construction of the works at Boulogne. The harbour is filled with sand, and we believe can only be entered by boats at high tide.

The roadstead of Ambleteuse is comprised between the Bassure de Baas and the land, and extends from the parallel of Wimereux to that of the village of Audrecelles. It is here that large vessels bound for the northern part of the Channel, or the ports of Calais and Dunkerque, arriving at neap tides, await the springs. The shelter, even for large ships, is from winds between N.N.E. easterly to S.S.E. The roadstead is considered a wild one, the sea being very heavy when the wind is opposed to the current.

Good bottom is found towards the middle of the channel between the Bassure de Baas and the shore, but rather nearer the land than the eastern limit of the rocky bottom called *l'ulturière*, which commences at cape Alprech and extends uninterruptedly from South to North, to the northern extremity of the shoalest parts of the Bassure de Baas—that is, to the west of the village of Ambleteuse. It is the same kind of rock that forms the western limit of the anchorage at Boulogne.

The eastern limit of the anchorage for large vessels may be considered as the direction in which the little tower of Renard is seen in one with the light-tower on the north-west jetty of Boulogne, bearing S.  $\frac{3}{4}$  W. Vessels may moor in this direction from the village of Wimereux to the line of the steeples of Ambleteuse and Bazinghen in one; but the places where the holding-ground is best, are—1. N.W. by W. of the entrance of Wimereux, with the tower du Renard open one or two degrees to the right of the light-turret at Boulogne, in  $7\frac{1}{2}$  fathoms, bottom of hard clayey mud; this is considered a very good anchorage for a large ship. 2. Renard tower, in one with the light-turret at Boulogne, and the steeple of Bazinghen open to northward of the fort of Ambleteuse, bearing E.  $\frac{1}{3}$  N. nearly; here there is a depth of 9 fathoms on mud, and good bottom. 3. Large merchant vessels may anchor in 7 fathoms, sand and broken shells, where the last-mentioned bearing is crossed by that of the Napoleon column in one with the middle of fort Croi.

The space between the eastern side of the Bassure de Baas and the rocky bottom already mentioned as limiting the anchorage in the road of Ambleteuse, is termed by the pilots of Boulogne the *Parfondingue*. The pilots usually place such vessels as intend remaining several days, in that part of the *Parfondingue* which is comprised between the Napoleon column in one with the southern end of point Creeche, and the steeple of Bazinghen in one with fort Ambleteuse, because with strong south-westerly winds there is sufficient space to double cape Grisnez, and ample protection from westward, the Bassure de Baas keeping off heavy seas.

*Tides.*—At the highest tides the flood abreast of Ambleteuse runs at a rate of  $3\frac{1}{2}$  to 4 miles an hour, and continues to do so in ordinary weather for about  $2\frac{1}{2}$  hours. The current follows the direction of the channel, and ceases nearly  $3\frac{3}{4}$  hours after high tide at Boulogne. The ebb is less rapid, but continues longer: it finishes  $2\frac{1}{2}$  hours before it is high water at Boulogne. The strength of these currents is, however, greatly dependent upon the wind.

From Audrecelles to point Oies, a distance of about 2 miles, the coast consists of sand-hills of a moderate height, covered with verdure; it afterwards rises a little in height and becomes steeper. At a mile south of point Oies is the small harbour of Wimereux.\*

Point Creche is  $1\frac{1}{3}$  miles from Wimereux, and nearly midway there is a small fort on the rocks off the coast, named Croi. The point is high and steep, as is all the coast thence to the western part of the town of Boulogne; at the foot of the point is a small fort, and here terminates the beach or strand of Boulogne. On one of the hills in the interior, behind point Creche, will be seen the Napoleon column.

**BOULOGNE.**—Boulogne harbour is at the entrance of the valley of the Liane, a small river, the waters of which are abundant in the rainy season and during the melting of the snow. It will now admit at ordinary spring tides vessels drawing 17 and 18 feet; and at the time of highest tides, when the sea is calm at the entrance, vessels of as great a draught as 20 feet. At ordinary neaps, those drawing 13 and 14 feet can enter as far as the stockade;—here large vessels must wait several days.

The artificial works are for the purpose of improving the banks at the mouth of the river, and directing the water so as to clear the harbour and its approaches, and there are reasons for supposing that without them the harbour would rapidly become filled with sand. Before the entrance there is a beach of sand, which uncovers at low water to the extent of about half a mile, and the highest part of which remains dry a long time at each tide; the sand is driven toward the shore by the wind, where it gradually increases the downs against which the north-west jetty is built. The same beach extends to the north of the jetties, and the eddies occasioned by these drive the sand into the north part of the entrance of the valley, so that the shore advances more and more to the westward. It is in the middle of this part that the entrance to the harbour is situated, the channel into which is between two strong wooden jetties.

The piers have at their southern end, in the channel of the river, a large basin used for holding water to scour out the bed of the river. The sides of the river are lined with quays of masonry, and on the western bank is a large semicircular basin, in which we believe vessels can lie afloat at all hours of the tide. Efforts are still being made to further improve the accommodation of the port.

The channel between the jetties is about four-tenths of a mile long, 220 feet wide, and lies in a S.E. by S. and N.W. by N. direction. The southern jetty is the longer of the two, and has a slight curve, the concave of which is turned towards the land. It is about 735 yards long, built on a stone foundation, and is surmounted by a wooden

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\* Wimereux is now abandoned. The port was formed by the outlet of the small river Wimille, which at the beginning of the present century was excavated sufficiently to admit small vessels. It consisted of a basin, access to which was between two piers or jetties; and behind the basin was another, furnished with sluice gates, for the purpose of retaining the water when the tide was down, in order to scour out the channel. A sudden flood of the river having broken down the sluice gates, the channel was destroyed, the surf dispersed the stones of the piers, and the sand and shingle produced by point Creche filled up the harbour. The piles of the jetties were afterwards used in some of the works at Boulogne. The ruin of the harbour entailed that of the village, so that its site is nearly covered by sand.

superstructure, planked to high-water level. This jetty amply protects the channel of the harbour during south-westerly gales.

The north-east jetty is 547 yards long, and parallel with the other; like it, it is built on a rocky foundation. Both are planked, and on them there is a walk, by means of which vessels may be hauled in.

In order to guide the water from the sluices to the extremity of the S.W. jetty, the N.E. jetty is prolonged in a parallel direction to it by means of a stone dike under water, which uncovers at low tide. The position of this dike is indicated by two black buoys; the first is at the end of the dike, and the second a cable within it.

Boulogne harbour is convenient to small vessels as a place of refuge to which they may run when occasion renders it necessary. It is a fishing port, and the steamboats belonging to it are principally engaged in the traffic with England.

The city of Boulogne is on the east side of the harbour, and stands in a kind of amphitheatre, the houses being built at the bottom and on the side of a small valley formed by two high hills. The buildings visible at sea are the belfry-tower and colonnade of the new cathedral of the higher town, the spire of the church of the lower town, the flagstaff of the Marine Baths, and a mill a short distance from this flagstaff.

*Lights.*—The time during which the channel is practicable is indicated by means of two small *fixed* lights, one over the other, on a little tower at the head of the S.W. jetty. A *red* light is also shown all night from a wooden stage at the head of the N.E. jetty. A fog-bell is on the south-west jetty.

The lights on the S.W. jetty may be seen 9 miles off, and the red light on the N.E. jetty is visible at the distance of 7 miles. The upper light on the S.W. jetty is exhibited when the depth in the channel into the harbour is  $9\frac{3}{4}$  feet; and the lower light at the moment of high water. They are both extinguished when the depth falls to  $9\frac{1}{4}$  feet. The harbour-master and his assistants are always on the jetty-heads while the vessels are able to enter.

*Tides.*—It is high water (establishment of the port) on the days of full and change, at 11h. 26m. P.M.; the mean range of springs is 25 and of neaps 14 feet. When the tide is down the entrance dries 2 and 3 feet. With strong winds from S.S.W. to W.N.W. the sea rises 1 or 2 feet higher, and with those from S.E. to E.N.E., nearly a foot less than the ordinary tides.

The sea being very heavy at the entrance of Boulogne, when it blows hard from S.S.W. westward to N.N.W., it is necessary to be certain, before running for the harbour, that there is water enough to enter without the risk of touching. The tide rises evenly, except in those tides which precede westerly winds. At high water, spring tides, it is slack for 20 or 25 minutes with westerly, and 12 to 15 minutes with easterly winds; but as the motion is very slow for half an hour before or after high water, it follows that there are about  $1\frac{1}{2}$  hours for ships to moor in the harbour. The low water slack lasts 30 or 40 minutes.

At 3 miles westward of Boulogne, outside the Bassure de Baas, the flood current acquires its greatest rapidity at the time of high water in the harbour, maintains it for about two hours, and ceases  $3\frac{3}{4}$  hours after high water.

At six-tenths of a mile outside the jetties the flood current ends about  $2\frac{3}{4}$  hours after high water within. With northerly winds it is not so much retarded, and it is quickened when the winds are southerly and westerly.

*Directions.*—The most remarkable landmarks in the vicinity of Boulogne, and to which attention should be paid when running for the harbour from westward, are mount St. Frioux; the hill of Herquelinghen; mount Lambert; cape Alprech and its lighthouse; the high lands north of Boulogne, upon which will be seen the Napoleon column; and cape Grisnez, also having a lighthouse upon it. The valley of the Liane,



at the entrance to which is the harbour and city of Boulogne, is itself very remarkable and easy to recognise. During day the buildings of the town may be seen from a considerable distance, and at night the lights in the houses, illuminating the lower regions of the atmosphere, sufficiently indicate the position of the city. The entrance of the port is N.W.  $\frac{1}{2}$  W. from the summit of mount Lambert, and W.  $\frac{1}{4}$  S. from the Napoleon column. The summit of mount Lambert, the highest point around Boulogne, is 1902 feet above low water; the top of the statue on the column is 1469 feet above the same level.

Vessels from westward, with the wind between West and South, ought to pass through the channel between the Bassure de Baas and the Vergoyer; but if the wind is from South to East they should keep between the Bassure de Baas and the land and wait till high water, in crossing this channel to the south of the line of the Napoleon column and the light-tower on the jetty; or, if the state of the sea permit, they can anchor in the roadstead of Boulogne.

Vessels from northward, with the wind from North to West, should pass westward of the Bassure de Baas, and wait outside this bank, if it blows hard, for the proper time to enter; but if the wind is light, they may cross the bank on the parallel of fort Creche, and bear up gradually towards the harbour, keeping at a short distance from it. When the wind is from North to East, it is more advantageous for vessels from northward to pass through the channel between the Bassure de Baas and the land, than to keep westward of the bank.

Nearly opposite the harbour, and almost due West from it, the Bassure de Baas is sufficiently under water to allow vessels of all sizes to cross it at any hour of the tide. The deepest part of the bank is precisely in the direction of the Napoleon column seen in one with the light-turret on the north-west jetty. Between one-third of the rising tide and two-thirds of the falling tide, springs, the same vessels can cross the Bassure between the parallels of point Alprech and fort Creche.

The roadstead of Boulogne is over a bed of hard clay, at the foot of the sand off the shore, on the deepest part of which the depth is less than  $4\frac{1}{2}$  fathoms. It is two-thirds of a mile long, North and South, and about a cable broad, and is excellent holding ground. It is limited towards the west by a rocky bottom covered with sand, and this rocky bottom has an extent eastward as far as the little fort of Ambleteuse bearing N.E.  $\frac{1}{3}$  N. The good bottom commences to the south, where the column is on with the light-tower on the north-west jetty, and ends to the north, where the building seen above the redoubt which crowns mount Lambert is in one with the belfry tower of the higher town. The best anchorages are with this mark and with the colonnade of the new cathedral on with the guardhouse of the battery of Châtillon, which is on the downs, a little south of the western jetty. Vessels of ordinary size having to wait some days to enter Boulogne can remain here, if the wind be moderate.

The harbour should only be entered by means of a pilot's assistance. Within it is every facility for the building and repairing of vessels.

The most favourable winds for entering Boulogne harbour are those from S.S.W. westward and northward to N.E. The valley of the Liane, running between high hills, modifies the direction of the winds blowing from South eastward to N.E. When the wind is South at sea, it is often S.S.E. and even S.E. in the channel of the harbour; and N.E. winds are often E.N.E. Strong gales from the N.E. are dangerous to attempt the harbour with, because of the violent gusts which then descend from the high land over the town.

The harbour ought to be entered as near as possible to the last hour of rising tide, when the current runs inwards, and facilitates the warping of the vessel towards the

harbour; but with fresh and leading winds it may be attempted with the ebb during the first hour of falling tide, except when the freshes from the Liane are strong. At all times it is necessary to carry as much sail as possible, to guard against the counter current between the jetties. This counter current proceeds from the eddies, occasioned, during the rising tide, by the projection of the north-west jetty from the coast; it is strongest during high water, or as soon as the sea covers the strand South of the harbour, and it is said to be necessary to guard against being carried North of the entrance by its effects. In general, when it blows from West southward and eastward to N.E., vessels are recommended to keep near the north-west jetty as they enter the harbour.

When the wind beats on shore, and the pilots cannot get out to vessels wishing to enter, they usually signal to them by the flag placed on the jetty light-tower. The flagstaff is inclined in the direction the ship ought to follow, and kept upright if she is in the right direction. In the event of there being several vessels, the signals are intended for that which is nearest the harbour.

Vessels, with a heavy gale at S.W., missing the entrance, ought to endeavour to pass northward of the north-east jetty, so as to run ashore as near as possible to this jetty in the bathing ground. If they strike half or three-quarters of an hour after high water, there is some chance of being able to get afloat again; but at all events the crew will be saved.

Vessels finding the sea too heavy to enter the harbour, should bear up immediately for Calais: for, when a heavy sea renders Boulogne harbour inaccessible, that of Calais is practicable; and reciprocally.

*Lifeboats.*—There are three lifeboats stationed near the marine baths at Boulogne, furnished with every requisite for assisting vessels in danger, and several watchmen are constantly on duty.

**THE COAST.**—From Boulogne to cape Alprech the distance is a little more than 2 miles. About half a mile from the jetties the coast rises in height and becomes clifly, and this continues as far as fort Couple and the village of Portel. At the base of these cliffs rocks extend out about four-tenths of a mile, and are dry at low tide; as these are very dangerous to vessels making Boulogne from southward, they should have a good berth given them, and it is recommended not to approach the land nearer than the light-turret on the north-west jetty bearing E. by N.  $\frac{3}{4}$  N. The sea breaks heavily upon these rocks during strong winds from West to North.

Portel is in a valley, of which the hills are of considerable elevation. The northernmost hill, mount Couple, has upon it a fort which commands the anchorage and port of Boulogne. Portel is inhabited by fishermen, who haul their boats on the beach in summer, but shelter them in Boulogne during bad weather. A small stream from the hills falls into the south part of the bay.

On the rocks almost immediately facing Portel is a small fort named Heurt, to which a wide berth should always be given when rounding cape Alprech, as the rocks extend some distance from its base.

**Cape Alprech Light.**—Cape Alprech is remarkable only by its height, which is about 135 feet above the sea; but the lighthouse upon its summit, and the circumstance of the outline of the coast suddenly changing its direction here from S.W. to S. by W., will enable even a stranger to recognise it easily. It consists of a perpendicular cliff of rock of brownish red colour, and at its base is a rocky bank, dry at low water, which extends out about a cable. The depth, almost close to these rocks, is 8 to 5 fathoms.

The lighthouse on the cape is near the tower of an old semaphore, and is 33 feet high; it shows, at 160 feet above the sea, a *fixed* light, varied every *two* minutes by a

red flash, which is preceded and followed by a short eclipse. In clear weather, the light should be visible from a distance of 12 miles.

From cape Alprech to point Lornel, at the entrance of the river Canche, the distance is nearly  $8\frac{1}{2}$  miles. The coast between is in general low, and bordered with downs of a moderate height; the bank in front of it gradually increases in width from the cape towards the point, where the depth of 3 fathoms is about a mile from shore. About 2 miles from the cape a little stream named Brone falls into the sea, and north of this are some small hills, upon the highest of which are the church of St. Etienne-au-Mont and the mills of Gravois, Alprech, Portel, and Outreau. Mount St. Friex is 3 miles N.E. from point Lornel.

**RIVER CANCHE.**—The entrance to the river Canche (known also as Etaples harbour) lies between points Lornel and Touquet. Off it are several banks, which frequently vary in form, consequently a description of them is useless. This harbour dries to the height of 6 to 14 feet every tide, and cannot be entered by strangers without a pilot. The entrance channel is or was buoyed, and the buoys are shifted in position when necessary, which is very frequent.

**Lights.**—At point Lornel, on the north side of the entrance, is the harbour light (*fixed*), which is 39 feet above the sea, and visible in clear weather at the distance of 6 miles. At point Touquet, on the south side of the entrance, there are also two *fixed* lights, distant from each other 819 feet N.N.E. and S.S.W.; they are 174 feet above the sea, and may be seen in clear weather from a distance of about 20 miles.

**River Authie** is  $8\frac{1}{2}$  miles southward of Etaples harbour, and the shallow bank lining the shore between them extends off (to the depth of 3 fathoms) in some places  $1\frac{1}{2}$  miles. The entrance, between points Haut Banc and Routhiauville, is obstructed by sand banks, which are dry when the tide is down, so that none but small vessels can enter, and their masters must be acquainted with the place to be able to take it without local assistance.

**Light.**—On point Haut Banc, the north side of the entrance, is a *fixed* light with *eclipses every 6 seconds*, at 115 feet above high water level, and visible in clear weather at the distance of 14 miles. It is obscured in the direction of danger over an arc of  $19^{\circ}$  by the steeple of the hospital. The light is of great service to the fishermen of Berck, who haul up their boats on a beach in the vicinity.

**Battur and Quemer Banks, &c.**—The banks named Battur, Quemer, and Basurelle de la Somme off this part of the coast are narrow, and have from  $5\frac{1}{2}$  to 9 fathoms water over them. All round them the depth is 10 to 18 fathoms, and as the Somme river is approached the water shallows to 5, 4, 3, and 2 fathoms. The banks are nearly parallel to each other, running about E.N.E. and W.S.W.; the outermost, the Battur, is 2 miles within the western extremity of the Bassure de Baas, and 10 miles from the shore between the rivers Authie and Somme.

**ST. VALERY-SUR-SOMME.**—The river Somme, 6 leagues S.W. by S. from the river Canche, is much frequented by merchant vessels, and indeed is the only port of note between Boulogne and Dieppe; but the entrance is very difficult, being greatly obstructed by extensive banks, over which the tide rises only 8 or 9 feet, although the perpendicular rise of the water outside is with springs 27, and with neaps 16 feet. It is high water on full and change days at 11h. 46m. There are two channels in, which are generally buoyed; strangers cannot enter without a pilot. To facilitate finding the outer buoys, which are very large, a monster red fairway buoy is moored in 5 fathoms outside the banks, with Cayeux lighthouse bearing E. by S.; Cayeux church tower, S.E.  $\frac{1}{4}$  E.; the middle of the valley of the town of Ault, S. by W.  $\frac{1}{3}$  W.; the buoy at the entrance of the north-west channel, E.N.E.  $1\frac{1}{2}$  miles; and that at the entrance of the south-west channel, S.E. by E.  $\frac{1}{2}$  E. one mile. This buoy may be



seen from a great distance, and should always be sighted when approaching the banks.

*Lights.*—At Cayeux, on the south side of the entrance to the river, there is a light-house, showing a *fixed* light, varied every *four minutes* by a bright *flash* of 8 to 10 seconds' duration; the flash is preceded and followed by a short eclipse, and the light is visible in clear weather from a distance of 14 miles. This light can be easily distinguished from that on cape d'Ailly, whose flashes succeed each other more rapidly, and are separated by total eclipses, except within the distance of 10 miles. It may be further remarked that the small lights at the entrance of the port of Dieppe, about 5 miles eastward of Ailly lighthouse, assist in preventing mistakes. Near Cayeux lighthouse is a signal-post for the use of the pilots.

Besides this primary light there is a *fixed* light about a third of a mile S.S.W. from it, to point out the south-west channel of the Somme. It is lighted  $3\frac{1}{2}$  hours after the beginning of the flood at the entrance to the channel, and extinguished  $1\frac{1}{2}$  hours after the beginning of the ebb.

At Hourdel point, the southern side of the river, there is a small *fixed* light, visible 6 miles; and eastward of it, on the north side of the river, is a small *fixed* light at Crotoy, which is visible from a similar distance. A small *red* light, 25 feet above the sea, and visible 3 miles, is also shown from a lamp post at the end of the towing bank in front of Harold's tower, St. Valery, opposite Crotoy.

**TREPORT.**—Treport is distant  $9\frac{1}{2}$  miles S.W. by W. from Cayeux lighthouse; the coast between bends inwards, and the depth in its vicinity decreases very gradually, except in the neighbourhood of Treport, where it is not so regular. Treport can receive only small handy vessels of light draught, its entrance, which dries to the height of 14 feet above low water, being narrow and very difficult to take. It is high water at 11h. 9m. on full and change days; springs range 27 and neaps 15 feet.

During day a large national flag is hoisted on a mast in front of the light-tower, when the depth in the channel is  $8\frac{1}{2}$  feet, and is kept up until high water; as soon as the ebb commences it is lowered to half-mast, in which position it remains while there is sufficient water for the fishing-boats.

When the tide does not rise sufficiently high at the neaps to admit vessels of more than  $6\frac{1}{2}$  feet draught, the light is only shown at night at the moment of high water, and is extinguished 5 or 6 minutes after. In the same manner the flag is hoisted during day and hauled down 4 or 5 minutes after. If from any cause the entrance is impracticable, the time of high water is nevertheless made known by signal both day and night; but the flag is immediately hauled down or the light extinguished.

To vessels approaching from northward the entrance to Treport appears as a hollow between two white cliffs, with a steeple in the middle, and the woods of Grange and Huon on the hills behind.

*Lights.*—Near the north end of the west mole-head there is a *fixed* light, which is shown as long as the depth in the channel at the head of the piers is  $6\frac{1}{2}$  feet; it is visible from a distance of 10 miles in clear weather,—near this light is a fog-bell. There is also a small *fixed red* light on the end of the east jetty.

Immediately westward of the entrance are Grange and Haume rocks, distant about a quarter of a mile from the shore, which must be avoided when making for the port.

**Franc-marque Bank.**—The Franc-marqué bank, the least water on which is  $2\frac{1}{3}$  fathoms, is nearly one mile long from E.N.E. to W.S.W., and about half a mile broad. The depth around it, and between it and the shore, is  $3\frac{1}{2}$ , 4, and 5 fathoms. Its centre is  $2\frac{1}{4}$  miles N. by E.  $\frac{1}{4}$  E. from the west mole-head of Treport.

**Ridins de Treport.**—The Ridins de Treport are some shoals of  $3\frac{1}{2}$  to 4 fathoms, distant  $2\frac{1}{2}$  miles from the nearest shore, with the village of Treport bearing from the middle one S.E.  $\frac{2}{3}$  S., distant  $3\frac{1}{2}$  miles. The steeple of the parish church at Eu between

the light-tower on Treport jetty and the epaulement of a little battery defending the entrance, is the mark for the western and most dangerous of them. Within and around these shoals the depth is 5 and  $7\frac{1}{2}$  fathoms.

**Ridins de Neuvelette.**—These are some detached shoals of 22 to 33 feet water, nearly midway between Treport and Dieppe, at from 1 to  $1\frac{1}{2}$  miles from shore.

**Ridins de Belleville.**—These shoals have over them a depth of  $4\frac{1}{4}$  to  $5\frac{1}{2}$  fathoms; they are scattered, and lie from  $1\frac{3}{4}$  to  $2\frac{3}{4}$  miles from shore, with the entrance of Dieppe harbour bearing from their centre S.W.  $\frac{1}{2}$  W., distant  $4\frac{1}{4}$  miles.

**Ridin de Dieppe.**—The Ridin de Dieppe is a narrow shoal half a mile long, with  $3\frac{3}{4}$  and  $4\frac{1}{2}$  fathoms water upon, and 5 to 11 fathoms immediately off it. Its shoalest part, near the south end, is  $10\frac{1}{4}$  miles N.E. by N.  $\frac{1}{2}$  N. from Dieppe.

**DIEPPE.**—Dieppe, 13 miles W. by S.  $\frac{1}{3}$  S. from Treport, is in a valley between two cliffs. When approached from sea two high steeples and a large castle (which stands westward of the town) are observed. On the north-east side of the town are the suburbs of Pollet, and the two stone jetties, between which lies the entrance of the harbour, which is rendered very difficult of access by the rapidity of the current, both inwards and outwards. As soon as a vessel anchors in the roadstead, it is visited by pilots, and a signal is made on shore when it is thought proper to enter the harbour.\* Vessels unable to enter until the ebb must desist making an attempt to pass in the moment the cautionary signal is made, because the strong current then prevailing, renders the channel extremely difficult,—occasionally it is impossible to stem the stream. When in the harbour, which dries about 3 feet at low water, vessels lie at the quay, well sheltered from all winds. It is high water (full and change) at 11h. 6m. P.M.; springs rise 25 to 30 feet, and neaps 15 feet.

**Lights.**—At Dieppe, the following lights are shown from a mast on the east jetty at about 30 feet from its head. A small *fixed* light at 23 feet above high water, shown all night and visible 6 miles. A small light 8 feet above the permanent light, which is lighted from  $2\frac{1}{2}$  hours before till two hours after high water. And, a small light between the two lights just mentioned, which is lighted two hours before high water, and extinguished at high water. The two latter are not lighted when bad weather prevents access to the port. For the guidance of vessels entering, the mast which supports the lights is kept vertical, while the vessel keeps her proper course, and inclined to that side towards which she ought to steer, if she deviates from it.†

A small *fixed* light is also shown from a stone tower on the west mole-head, at about 38 yards from its extremity. It is 39 feet above high water and exhibited as long as the depth in the channel is 10 feet. It is visible about 10 miles.

When the entrance is practicable during day, a large national flag is hoisted on a mast in front of the light-tower; it is hoisted as soon as the depth in the channel is  $10\frac{1}{2}$  feet, and hauled down when the ebb commences. If the bar cannot be crossed without danger, or the channel be blocked by a vessel grounding in it, a red flag is hoisted instead of the national colours; and at night, the mast which carries the three lights is placed in a horizontal position.

**Point d'Ailly Light.**—About  $4\frac{1}{4}$  miles westward of Dieppe is point d'Ailly, off which the ground is foul to the distance of 2 miles from the shore. Within half a mile of the rocks the depth is 6 and 7 fathoms, but vessels should keep in not less than 10 or 12 fathoms to go clear of danger. The lighthouse on the cape consists of a square

\* The roadstead is westward of Dieppe, and opposite a small church with a remarkable steeple. Here ships, waiting for the tide to run into the harbour, anchor in 5 or 6 fathoms on good ground, well sheltered from easterly or southerly winds, but exposed to all others.

† Vessels desirous of profiting by these signals should show two lights, one forward and one aft.

tower 65 feet high. It shows a *revolving* light, the eclipses of which succeed each other *every minute*, but are not total within the distance of 12 miles. The light is 305 feet above the sea, and visible at the distance of 27 miles.

**Raz de St. Michel.**—This rocky bank extends from the shore of St. Aubin-sur-Mer ( $3\frac{3}{4}$  miles westward from Ailly lighthouse) about a mile. The least water on its outer part, 2 fathoms, lies W. by N. from the lighthouse. Vessels passing should not get into less than 12 fathoms to go clear of it.

**ST. VALERY-EN-CAUX** is about 10 miles W.  $\frac{1}{2}$  N. from cape d'Ailly, and as the coast between is foul, vessels should avoid approaching it nearer than the depth of 14 fathoms. The intermediate land consists of a high white cliff, in which there are but two openings; St. Valery is in the third opening. This harbour is capable of receiving about thirty vessels of moderate size, and of that number five or six may always be afloat. The tides rise here as at Dieppe: springs range 27 feet, and neaps 15 feet, and it is high water (full and change) at 10h. 46m.

**Lights.**—The *fixed* light on the western jetty (shown from a square brick tower at about 72 yards from its extremity) is  $29\frac{1}{2}$  feet above the water, and visible in clear weather at the distance of 6 miles; it is exhibited when there are  $8\frac{1}{2}$  feet water in the channel at the end of the jetties. There is also a small *red fixed* light on the extremity of the eastern jetty.

During day a large national flag is kept flying on a flagstaff erected in front of the light-tower while the above depth is in the entrance channel. When vessels of different sizes are off the harbour waiting to go in, the flag is hoisted half mast as soon as there is water in the entrance for those of the smaller draught, and hoisted quite up when there is sufficient water for the others.

In an easterly direction from the entrance to St. Valery-en-Caux, distant three-quarters of a mile, are some foul grounds known as the Ridens, the least water on which is only 2 feet; consequently, vessels should keep fully a mile from the shore, until the lights bear S.W. by W.  $\frac{1}{2}$  W., or till the chapel at the east side of the harbour bears S.W. Three-quarters of a mile westward of the port is the steeple of St. Leger.

**FECAAMP.**—Fecamp is about 15 miles westward from St. Valery-en-Caux, and the coast between is bounded by white cliffs surmounted with woods. Inland are numerous steeples, and also three valleys, which, though they do not extend quite to the shore, give their name to this part of the coast. Fecamp harbour is in a wide valley, and may be easily recognised by the church of Notre Dame de Salut and the lighthouse, both near the shore, north-eastward of the entrance. The entrance lies almost E.S.E. and W.N.W., and is easily accessible unless the wind blows fresh from the S.W. or the West. At low water, the depth in the channel is from 8 to 9 feet at dead neaps, and from 3 to 4 feet at high springs. The establishment of the port is 10h. 44m. The range of ordinary spring tides is about 23 to 25 feet, that of neap tides from 12 to 13 feet; thus, the depth in the channel at high water, neap tides, is from 21 to 22 feet,—and at ordinary spring tides, from 26 to 28 feet.

**Light.**—The *fixed* light shown from the tower on Fagnet point, eastward of the entrance to the port, is 374 feet above the sea, and visible 18 miles.

A *fixed* light (varied by a bright flash every three minutes) is shown from a small stone tower standing 58 yards from the extremity of the north jetty, while the depth in the entrance channel is more than 10 feet; it is 39 feet above high water, and visible 10 miles. A vessel approaching the harbour from eastward will not open the light till it bears southward of S.W. by W.

There is also a fixed *red* light, visible 5 miles, near the end of the south jetty.

The time during which the floating docks are accessible is indicated by a flag (white with a blue border) hoisted on the staff on the north jetty.



The depth of water at the entrance is, during the day, indicated from a mast situated on the south jetty, and according to the usual system adopted at all the French ports.

In signalling the depth of water, whether by the flagstaff or by the lighthouse on the north jetty, the standard is the height of the water above the ridge of rocks that extends from the base of that jetty; in the channel, therefore, the depth is 4 feet more.

During foggy weather, a bell on the north jetty is sounded.

*Tidal harbour.*—The tidal harbour is perfectly sheltered in all weathers, and the bottom is good for lying aground. Weather-bound vessels that cannot enter the floating dock may lie there in safety. There is always water in the channel leading to the lock.

*Floating docks.*—The lock-gates leading into the first floating dock are 55 feet wide; and the depth on the sill is 29 to 31 feet at ordinary spring tides, and 24 to 25 feet at neaps. The lock leading from the first to the second basin is only  $32\frac{1}{2}$  feet wide, with a depth on the sill of 12 to 13 feet at neaps, and 17 to 18 feet at springs.

The railway runs on to the quay. There is a good crane, and also sheers; the port owns a tug; and there is a gridiron in the tidal basin.

The fog-bell is sounded in foggy weather every 5 minutes, and the number of tinklings indicates the rise of water at the entrance, thus 1 tinkling represents 10 feet, 2 tinklings 13 feet, 3 tinklings 16 feet, or a tinkling for each three feet: a tinkling consists of four strokes in quick succession, delivered two and two.

There are two roadsteads before Fecamp, named Great and Little. Great road lies opposite Criquebœuf,  $1\frac{3}{4}$  miles westward of Fecamp, and about 2 miles from shore; the depth is 12 or 13 fathoms, over clay mixed with sand, which holds extremely well. Little road lies over against the west side of the harbour, and its depth is 10 to 7 fathoms. Indeed, on any part of the coast between St. Valery-en-Caux and Fecamp, vessels may stop a tide in 9 or 10 fathoms; the ground, being a mixture of clay and sand, is good for holding.

From off Fecamp the course and distance to a similar offing from cape d'Antifer are W. by S. 9 miles, and thence to cape La Heve S.W. 13 miles. All the coast consists of high white cliffs which terminate at the last mentioned point.

**Cape La Heve.**—On cape La Heve are two lighthouses, each of which shows a *fixed* electric light visible 27 miles. These buildings are so placed that they cannot be seen in line by vessels approaching from northward, north-west or westward; hence they cannot be mistaken for the tower on cape Barfleur, nor for that on cape d'Ailly. Vessels bound to the river Seine will see the towers in line only from one direction (N.E. from the observer); and so close an approach to the river is very hazardous to attempt before half flood, considering the dangers in the vicinity of the Little road of Havre. The towers are of freestone,—on level ground, and of equal height; they are 66 feet high, and the lanterns are 397 feet above the sea.

**HAVRE.**—Havre is about  $2\frac{1}{2}$  miles S. by E.  $\frac{3}{4}$  E. from cape La Heve; the land between is low and full of windmills. The town stands upon a level spot of ground gained from the sea, and its harbour being entirely the work of art, requires the aid of continual industry to keep it in proper order. The harbour lies within the walls of the town; it extends east and west, and is sufficiently extensive to receive about 600 vessels. The entrance, nearly dry at low water, is formed by two jetties, or piers of stone, the longest of which is on the west side. On full and change days it is high water at 9h. 51m.; springs range about 22 feet, and neaps  $12\frac{1}{2}$  feet.

*Lights.*—The *fixed* light on the north-west jetty is 36 feet from its extremity, and

shown at the height of 39 feet above the sea; it is visible at the distance of 10 miles. During foggy weather a bell is sounded.\*

On the head of the eastern jetty there is also a small orange-colour light of inferior power, which may be seen at the distance of one mile. Coloured glasses are so arranged in a lantern on the quay of the outer harbour as to lead in to François tower.

The harbour has a peculiar advantage, not only over the other seaports of Normandy, but over those of the whole of France. The water in it does not perceptibly ebb until three hours after high water; in consequence of this peculiarity, fleets of 120 sail have often left it in one tide, and even with the wind against them. The cause of this is generally ascribed to the Seine, whose current, when the sea begins to retire, comes down and crosses the jetty heads with such force as to hinder the water in the harbour running out, until the water outside has fallen to a certain degree below it, which, as has already been observed, generally happens about 3 hours after high water.

*Havre Roadsteads.*—The two roadsteads before the mouth of the river are known as the Great and the Little roadstead. The Great road is about 4 miles westward of cape La Heve, and has an extent from North to South of about 3 miles; the depth in it is  $6\frac{1}{2}$  to 9 fathoms; and the best anchorage is about a league West, or West (southerly) from cape La Heve, in 8 fathoms muddy bottom, with Orcher chateau (on a steep cliff about 5 miles eastward of Havre) a little open of the land of Ingouville (northward of Havre);—in rough weather a vessel should be moored. Here the flood-tide sets as follows: the first two hours South, the next two hours S.E., the fifth hour East, and during the remainder of the tide N.E. to N.W.

The Little road is under cape La Heve, in a S.S.W. direction, and distant  $1\frac{1}{2}$  miles N.W. from the entrance of Havre; its depth is 3 or 4 fathoms at low water. This roadstead is of square form, and extends about three-quarters of a mile every way; the bottom is of clay, and holds well, but it is covered with pebbles and oysters.

The banks separating the two roadsteads are named Eclat and High Grounds. Their limits and dangerous parts are buoyed, and the buoys are shifted in position according to the changes that occur.

The shoalest part of the Eclat bank, a spot nearly awash at low water, is  $1\frac{1}{8}$  miles S.W. by W. from the lighthouses on cape La Heve, and around it on all sides to the distance of  $\frac{1}{6}$  of a mile is a depth of only 8 to 12 feet; half-a-mile N.N.E. from this spot are some other shallow patches of 6 and 9 feet, but in the intervening space, as also between these patches and the cape, the least water is 11 and 12 feet.

The High Grounds (*Les Hauts de la Rade*) bound the Little road to the south-westward and southward. They consist of some patches of 6 inches to 6 feet on a 2-fathom flat, lying  $1\frac{1}{2}$  miles from the shore, and extending in a N.N.W. and S.S.E. direction; their S.E. end joins the bank which runs westward from the coast at Havre, and their shoalest spot is distant rather more than a mile W.  $\frac{1}{4}$  N. from the lighthouse on the western pier-head.

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\* With the view of preventing accidents to vessels entering the port of Havre the captain of the port established the following signals in 1858:—

If the national flag be not hoisted, or another flag be flying instead of it, ships should not approach the port without being able to stand off again when necessary.

The following signals will be made at the flagstaff on the northern (N.W.) pier, for the entrance and departure of vessels of the Transatlantic Company and ships of the State.

No. 1.—*A red flag* . . The port is inaccessible.

No. 2.—*A blue pennant* } Sailing ships and small steamers are not to enter. Large ships and  
*A red flag* } steamers of the Transatlantic Company may enter.

No. 3.—*Red flag* . . } No ships of any kind are to enter, nor are any ships to go out, the  
*Blue pennant* . . } entrance being blocked up.

No. 4.—*Blue pennant* } The officers of the port not to go out, nor to make any movements  
*Blue pennant* . . } whatever.

**Hoc Roadstead** lies off the shore eastward of Havre, between it and Amfard bank, an extensive flat about a mile from the land, and dry at low water; the western extremity of this bank bears from the entrance of Havre S.S.W.  $1\frac{3}{4}$  miles. The depth of this roadstead has recently so considerably decreased, that the following notice has been issued: "Vessels have hitherto been in the habit of bringing up in the Hoc roads, in 4 or 5 fathoms water. An alteration has, however, taken place, by which the depth has decreased; therefore, any vessel running for the Hoc must go inside, round the point, where she can lie aground without danger, there being no safety for them outside."\*

*Directions.*—Vessels bound to Havre must have the assistance of a pilot, as the sands frequently shift. In the very improbable event of not being able to get one, and being compelled by circumstances to enter, the following instructions may be useful:—

If from northward, steer for the lighthouses on cape La Heve until the jetty-head or its light (at the entrance of the port) bears S.S.E.  $\frac{1}{4}$  E., then immediately alter course to South, and continue thus till about half way between the cape and Havre, when anchor if necessary in 3 or 4 fathoms, until the proper time to enter the harbour arrives. If in the Great road and desiring to go to the Little road, sail over Eclat bank, with Orcher chateau bearing E.S.E., until the land northward of La Heve is shut in with the cape; then proceed on a little further and anchor as before directed.

At night the leading mark to pass from the Great road to the Little road across Eclat bank in the deepest water is, the flashing light at Fatouville,† in line with or just open northward of the mole-head light, till cape La Heve lights are in one, then anchor or proceed to the harbour.

With a rising tide, vessels from westward may steer for the harbour by bringing the steeple at Graville in one with the pier-head light. In this course the depth at low tide is 4 fathoms at the distance of 7 miles from the port, then  $2\frac{3}{4}$ ,  $6\frac{3}{4}$ , 2 fathoms, and 6 to 3 feet, the last being very near the entrance.‡ If desirous of anchoring in the Little road;—having brought the last-mentioned bearing on, continue it till the cape lights are in one, then, at high tide, alter the course to the latter direction, and it will carry over Les Hauts de Rade, at a part where, with low water, the depth does not exceed 6 feet. When the flashing light at Fatouville comes in one with the pier-head light, anchor in 3 or  $4\frac{1}{2}$  fathoms.

As Havre harbour is dry at low water, a ship cannot enter it until the tide has flowed sufficiently to suit its draught. The tide rises 22 feet at springs, and 18 feet at neaps.

**HONFLEUR.**—Honfleur lies S.E. by S. 6 miles from Havre. The harbour dries when the tide is down, the low-water mark being some distance outside the jetty-heads; immediately outside the entrance the ground is 5 feet above low-water level. On full and change days it is high water at 9h. 29m.; springs range 23, and neaps 11 feet.

*Lights.*—The two lights at Honfleur are as follows:—A *fixed* light on the hospital jetty at the north-west extremity of the town, and 92 feet above high water, and visible 14 miles; and a *red* tide-light, on the east jetty, at 30 feet above high-water level, and visible about 7 miles; this light is shown as soon as the depth in the entrance is  $6\frac{1}{2}$  feet.

\* On Hoc point,  $3\frac{1}{2}$  miles eastward from Havre jetties, is a small *fixed* light visible 10 miles.

† This light is on the heights at Fatouville, 10 miles S.E. from Havre. A red flash occurs every three minutes. It is 420 feet above the sea, and visible at the distance of 20 miles.

‡ This line of bearing leads across a  $4\frac{1}{2}$ -foot (at low water) spot on the Hauts de Rade.



The banks between Havre and Honfleur frequently shift, and are more or less dry at low tide. The principal are known by the names of Amfard, Ratier, and Trouville. The first extends, as already mentioned, from abreast Havre, and is the western extremity of the bank that juts off from the northern shore of the river eastward of Hoc point; opposite Honfleur it occupies the middle of the river, and there is a narrow and shallow channel on each side of it. The Ratier is about  $1\frac{1}{2}$  miles from the southern shore, abreast Villerville, and between it and the rocks off point Villerville is a channel three-quarters of a mile wide, and 4 to 22 feet deep; the bank is 2 miles in length, and dries 10 feet in height in parts.

From the western edge of the Ratier the bank, named Trouville, the outermost on the south side of the mouth of the Seine, extends S.W. by W. a distance of 3 miles, and dries from 1 to 5 feet above low water; its western extremity (6 feet) is  $1\frac{1}{2}$  miles N.W. from the mouth of the river Touques, and between the depth varies from 2 to 14 feet, in a channel about a mile wide, the deepest water being near the banks fronting the shore.

With a rising tide, vessels bound to Honfleur can pass over the bank eastward of the Ratier by bringing Fatouville light in one with the western light at Honfleur; point Roque in one with the cliffs at Honfleur will also lead over the northern part of Trouville bank. These marks may be continued till within  $1\frac{3}{4}$  miles of the town, when by keeping about a third of a mile from the shore, the rocks running from it will be avoided, and the mouth of the harbour will come open. But the banks alter in shape and depth so frequently, that a stranger should not attempt to cross them without a pilot, especially as the danger is much increased by the rapidity of the tides.

**TROUVILLE.**—The entrance of the river Touques lies S.S.W.  $\frac{1}{2}$  W. 7 miles from Havre, and  $7\frac{1}{2}$  miles from Honfleur. At low water the bar, the sea-side of which is half-a-mile from the entrance of the river, is dry 5 feet, but within at that time the depth is 6 to 12 feet. It is high water on full and change days at 9h. 34m., and the rise of the tide is nearly similar to that at Havre and Honfleur.

**Lights.**—At the west side of the entrance of the river are two *fixed* lights, 153 yards from each other; the outer light is 20 feet above the sea, and visible 6 miles; the inner light (shown all night) is 33 feet high, and may be also seen in clear weather at a distance of 6 miles. The two lights in one show the direction of the channel. The outer light is shown while the depth on the bar is 7 feet. A small *green* light, visible 2 miles only, is also shown from a pole on the north side of the east jetty.

Vessels bound to Trouville must carefully guard against the Trouville bank, the western extremity of which, as above mentioned, is  $1\frac{1}{2}$  miles N.W. from the entrance.

The tide signals at Trouville harbour (now made from the earth-works of La Cahotte) show the least water prevailing in the whole extent of the channel. They commence at 6 feet, and indicate the change every quarter of a metre (about three quarters of a foot), according to the system of tide signals adopted in France.

**DIVES** is 7 miles W.  $\frac{1}{2}$  S. from the river Touques. It is a small place, with a harbour dry at low water. The sand brought down by the river has formed a bank, of which the outer part is about a mile from its entrance; this bank dries to a considerable height at low tide. The range of spring and neap tides is 21 and 11 feet respectively; upon full and change days it is high water at 9h. 39m.

**Lights.**—Two *fixed red* lights, visible 9 and 7 miles respectively, show the direction of the channel into the river Dives. They are on the eastern bank, and the lower light is exhibited only while the depth in the channel exceeds  $6\frac{1}{2}$  feet.

**CAEN.**—The river Orne, 5 miles westward from the river Dives, and 47 miles

S.E.  $\frac{1}{2}$  S. from cape Barfleur, is fronted by extensive shifting banks. A canal has been constructed from the sea to the town of Caen, distant not quite 8 miles; by the river the distance is  $11\frac{1}{4}$  miles. This canal is of considerable advantage, for large vessels (which hitherto could only ascend to the town at the very highest tides) can now go up at any period, the least depth being 13 to 12 feet. Vessels, therefore, not drawing more than  $11\frac{1}{2}$  feet, are allowed to pass through it. There is also a port of refuge at Oyestreham, where, in stormy weather, vessels of 500 to 600 tons can find shelter.

At Oyestreham it is high water at 9h. 38m., and at Caen at 10h. 57m., on the full and change days; springs range 21 and neaps 11 at the former place.

**Lights.**—From the church tower of Oyestreham a *fixed* light is shown at an elevation of 92 feet above high water, and is visible in clear weather at the distance of 10 miles. Another light, of less power, is placed on a mast near Oyestreham redoubt, 1203 yards N.E.  $\frac{1}{4}$  N. from it; this is visible at the distance of 6 miles. The lights in one *formerly* pointed out the entrance of the channel into the river.

On the west jetty of Oyestreham a temporary *fixed red* light is exhibited 3 hours before and after high water, and a *fixed green* light is also shown on the east jetty; the red light is visible 4, and the green light 3 miles.

Caen roadstead is  $2\frac{1}{2}$  miles northward of Oyestreham light, and is from 3 to  $5\frac{1}{2}$  fathoms deep, over sand, mud, and clay. Strangers bound to the river should obtain the assistance of a pilot.

**Plateau du Calvados.**—This dangerous flat commences  $5\frac{1}{2}$  miles north-westward of the mouth of the river Orne, at the part where to an observer at sea the steeples of Douvres and Langrune appear in one, and extends thence  $9\frac{3}{4}$  miles along the coast, its outer edge being  $1\frac{3}{4}$  miles to 2 miles from it. On its eastern part are the rocks known as the Essarts de Langrune, whose northern edge is marked by a red bell buoy; abreast point de Ver are the Ver rocks, and on its western end the Calvados rocks, whose north-western extremity is also marked by a buoy. Vessels must not approach this plateau nearer than the depth of 12 or 14 fathoms, the depth close to them being 6 and 8 fathoms; the various rocks on it uncover at spring tides only, hence the necessity for additional caution.

**Courseulles.**—Courseulles is a small place suitable only for very small craft, distant 9 miles from the river Orne, and  $2\frac{1}{2}$  miles eastward of point de Ver lighthouse. The entrance is between jetties. A small *fixed* light is on the head of the western jetty; it is 30 feet above high water, and visible 6 miles.

**Point de Ver Light.**—About  $2\frac{1}{2}$  miles westward of Courseulles is point de Ver, upon which is a lighthouse 43 feet high. The light, *fixed*, is varied by *flashes*, each of which lasts 10 seconds, and the faint light seen between them is interrupted by short eclipses, a revolution being performed in 4 minutes. The flash is preceded and followed by a short eclipse, but the light does not quite disappear within the distance of 6 miles. The lighthouse stands on the slope of a small hill 800 yards from the sea, and shows the light at 138 feet above the sea, visible at the distance of 14 miles.

**Port-en-Bessin,** about 9 miles westward of point de Ver lighthouse, is a small fishing town, which may be recognised by two lofty woods above it, appearing like little mountains. Two small *fixed* lights on the west side of the entrance, shown at an elevation of 92 and 131 feet, are visible 6 to 12 miles. They bear from each other N.E. by E. and S.W. by W., distant 79 yards; the highest and furthest from the sea is coloured *red*, while the depth on the bar is less than 11 feet.

**Grandchamp Light.**—From Port-en-Bessin to Grandchamp, a little fishing village, the distance along the coast is  $11\frac{1}{2}$  miles; at this latter place there is a small *fixed* light, which can be seen about 6 miles. Abreast Grandchamp the rocks extend from shore nearly  $1\frac{1}{2}$  miles; close outside them is a depth of 3 fathoms.

**LA RAVINE.**—Isigny and Carentan are two towns at the bottom of a large bay, which is known under the general name of La Ravine. The former is on the Vire river in its S.E., and the latter in its S.W. corner, and they are distant respectively about  $5\frac{1}{2}$  and 8 miles from the sea. The bay is 4 miles wide at its entrance, and its width decreases to  $2\frac{1}{2}$  miles towards its head; it is  $4\frac{1}{4}$  miles deep, and filled by sand-banks with narrow and shallow channels between them, through which small vessels, whose masters are acquainted, ascend to Isigny or Carentan. The channel to Carentan is now buoyed, notwithstanding which strangers should employ a pilot. Carentan possesses a large tidal basin, having an entrance from the sea; this basin contains three locks, and there is a quay 820 feet long.

Vessels bound to Carentan or Isigny from La Hougue, and sailing between the Cardonnet bank and the coast, should not approach that bank nor the rocks of Grandchamp nearer than a depth of 5 or 6 fathoms, as both are steep.

**Lights.**—At Isigny are two *fixed* lights N. by E.  $\frac{1}{3}$  E. and S. by W.  $\frac{1}{2}$  W., 1968 feet from each other; they are 43 and 27 feet above the sea, and can be seen at the distance of about 12 miles.

Two *fixed* lights have also been established at Carentan. The lower, *red*, is on a wooden scaffold, 13 feet high, erected on the sea bank; it is 16 feet above high water level, and can be seen from a distance of about 7 miles. The upper, *white*, is also from a wooden scaffold, 38 feet high, erected at Brevand (940 yards S.W.  $\frac{1}{2}$  W. from the lower light); it is 49 feet above high water and visible about 7 miles.

**St. Marcouf Isles, &c.**—About 13 miles South from cape Barfleur, and 16 leagues W. by N.  $\frac{3}{4}$  N. from cape La Heve, are the small islands of St. Marcouf, of moderate height, and surrounded by a rocky reef. Between the islands there is a narrow channel, through which is a rapid current, and a heavy sea when the wind blows strongly, at which time the anchorage is very dangerous.

A bank stretches out from each end of the group. The south-eastern, known as the Cardonnet bank, extends in a direction nearly parallel to the coast, in a S.E.  $\frac{1}{2}$  S. direction, a distance of 6 miles, and consists of sand and broken shells. It is about half a mile wide where broadest, and has over it a general depth of  $2\frac{1}{2}$  to 4 fathoms, except within a mile of the islands, where there is much less water, there being spots of 3 feet to  $1\frac{1}{2}$  fathoms. On the north side the bank is very steep, but on the south side the soundings in approaching it are more gradual. During ebb-tide the sea breaks with considerable violence upon the bank, particularly when the wind blows in a direction opposed to the current. The mark for the south-eastern end of the bank is Colleville steeple in one with Percée point, S.E. by S.  $\frac{1}{2}$  S.

The north-western bank, the Banc de St. Marcouf, extends in a N.N.W. direction parallel to the coast. It is about 3 miles long, and half a mile broad, and has in general a depth of  $2\frac{1}{2}$  and 4 fathoms upon it, although in parts there are not more than 9 to 12 feet.

**Lights.**—The eastern St. Marcouf island is distinguished by a *fixed* light, which is shown from the fort at the height of 56 feet above the sea, and visible about 8 miles.

**LA HOGUE.**—The harbour of La Hougue, on the western side of the fort, will admit at high tide vessels drawing 12 and 14 feet, but is dry at low water. It affords shelter from all winds, excepting those from southward, to which it is exposed. The bottom is of sand, stones, and clay, and the passage in and out is easy.

At La Hougue and in the vicinity are four small *fixed* lights, of which one is on Reville fort (at the extremity of point Saire): one, *red*, on the head of the jetty of St. Vaast;\* one on Morsaline heights, and the fourth on the southern extremity of fort

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\* This light is visible about 5 miles. A bell is sounded during foggy weather.



La Hougue. The distance to which each of these lights is visible is about 10 miles. The light on Morsaline heights is 282 feet above the sea, the others are only 36 feet.

La Hougue roadstead affords good shelter from winds between S.S.W. and N.W., but not from those in the N.N.E. to S.S.E. quarters, which, when blowing moderately, produce only an unpleasant roughness of the sea, but when with any force, a very heavy sea. The ground holds well.

On the east side of the roadstead, and just within the bank of St. Marcouf, is a long narrow shoal known as the Banc de la Rade, upon which the depth is  $3\frac{1}{2}$  to 4 fathoms, except near the centre, where it is not more than  $1\frac{3}{4}$  fathoms.

About  $1\frac{1}{2}$  miles E. by N. from fort La Hougue, and a short distance eastward of St. Vaast, is the small islet Tatihou, with its fort. This islet is rocky all round, and has a dangerous ledge extending fully three-fourths of a mile southward from it, between which and the north end of the Banc de la Rade is the N.E. channel to the roadstead. Northward of Tatihou, and between it and Saire point, is a small bay, dry at low water. At the back of the bay is the village of Reville, with its church.

The light on Reville fort in one with the revolving light of cape Barfleur, gives a line of direction, westward of which it is not safe for vessels to go when tacking at night in the vicinity of Tatihou island, in order to attain the entrance to the roadstead of La Hougue.

The lights on Morsaline and fort La Hougue, when in one, show the northern limit of the channel by which large vessels should enter the roadstead. This line of direction crosses the south side of the highest part of the West Drix shoal, upon which the depth is only 15 feet at low water spring-tides. Large ships bound to La Hougue, at night, should proceed from the point where these two lights cross with the line of the lights at fort Reville and cape Barfleur in one, and steer so that they have the light on Morsaline open some degrees southward of that of La Hougue, as they will then avoid the West Drix.

Large ships bound to the Great roadstead should steer from the point above alluded to (where the two lines of the four lights cross each other) W. by S.  $\frac{3}{4}$  S. until west of the Banc de la Rade, when they should anchor in 6 or 5 fathoms. In taking this route, they will pass between the West Drix and the north part of the Banc de la Rade.

The fishing boats of St. Vaast, as well as small coasting vessels seeking shelter in the Little road of La Hougue, and fearful of falling south of the best sheltered part of the anchorage, carefully keep the lights of La Hougue and Morsaline in one when the sea is moderate,—or, in rough weather, the light of Morsaline open a few degrees south of that of La Hougue.

Although it has been proved by surveyors that the sands in the vicinity of La Hougue frequently shift in position, the roadstead undoubtedly furnishes very good anchorage for vessels of all sizes.

About  $1\frac{3}{4}$  miles S.E.  $\frac{1}{2}$  S. from the lighthouse on point Saire is a small 6-fathom shoal named Pernelle, which lies with Moulard rock (off point Moulard) in one with the lighthouse on cape Barfleur. Another patch of  $4\frac{1}{2}$  fathoms (the Reville) is about half a mile northward of it, and also in the line of the rock in one with the lighthouse. These shoals are not dangerous, as they can be crossed by all but the largest vessels.

**Moulard Point and Rock.**—Nearly 3 miles northward of Saire point is point Moulard; the shore between is lined with rocks, which extend a considerable distance into the sea, and are dry when the tide is down. This point is of moderate height, and surrounded with rocks that extend out fully a mile; and there are also patches dangerous at low water.

A short distance south-eastward from Moulard point is a rock of the same name, which dries  $22\frac{1}{2}$  feet in height. It is on one of the dangerous rocky heads off the point, and foul ground extends considerably eastward of it. This rock is an important object to seamen sailing in the vicinity, as it shows them the rise of the tide; when covered, and a smooth sea, the rocky ledges that do not show at low water, situated between the point of Barfleur and port La Hougue, may be crossed by sailing vessels without danger.

From Moulard point the coast continues to run in a northerly direction about  $2\frac{3}{4}$  miles to cape Barfleur, and presents a similar appearance to that southward of the point. It is lined with rocky ledges, which render a near approach to the land very dangerous, as they extend out a considerable distance, and dry at low water.

**BARFLEUR.**—About halfway between Moulard and Barfleur points is the small harbour of Barfleur, which is by no means easy of access, the approach to it being encumbered with rocks. It is dry at low tide, therefore only vessels of light draught, or such as can bear the ground, should run for it, and these must be navigated by some one well acquainted with the locality. The rocks on the north side of the channel are known as the Roches à l'Anglais, and those on the south side (consisting of a very extensive bed), the Plateau des Antiquaires; many of the latter are above the surface at low water, and others, nearer the shore, are never covered except with the highest springs.

*Lights.*—On the south side of Barfleur harbour are two small *fixed* lights, shown at 43 and 23 feet above high water, which bear from each other nearly N.E. by E.  $\frac{1}{2}$  E. and S.W. by W.  $\frac{1}{2}$  W., distant 927 feet, and are visible in clear weather about 10 miles; these brought into line are the leading mark for sailing into the harbour.

Vessels sailing into the harbour pass between two beacons, of which the outer or northern one marks the Vinberge (one of Roches à l'Anglais), and the southern one the Raie rock (on the Plateau des Antiquaires); further in are other beacons. The marks for anchoring in the roadstead are, Monfarville and La Pernelle churches in one, bearing S.W.  $\frac{1}{4}$  W., and cape Barfleur lighthouse N.  $\frac{3}{4}$  W.; here the depth is 4 to 5 fathoms on mud, sand, and shells. The leading mark for entering the harbour will also lead to this anchorage.

**CAPE BARFLEUR.**—Cape Barfleur is a low point, the extremity of land projecting in a north-easterly direction, and has off it numerous rocks which are dry at low water. On its extremity there are two towers of unequal height. The highest (the southern) tower shows a *revolving* light, the flashes of which appear every *half minute*, and in fine weather may be seen at the distance of 22 miles; these flashes are total only beyond 12 miles. The light is 236 feet above the level of high water.\*

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\* *The following are some useful observations relative to the lighthouses of capes d'Ailly, La Heve, and Barfleur* :—These lighthouses are so situated, that vessels approaching Havre from north-eastward will see immediately the light of cape d'Ailly, which in fine weather will remain in sight almost till the lights of cape La Heve appear. Between capes d'Ailly and La Heve is the fixed light of Fecamp, visible 18 miles. Ships from Havre, bound down Channel, will not be long after they lose sight of the lights of cape La Heve before they perceive that of cape Barfleur; and ships from sea bound to Havre and Dieppe, after they see the three lights of the Casquets, will soon perceive the light of cape Barfleur, which will direct them to the two lights of cape La Heve, if they are going to Havre, or to that of cape d'Ailly, if going to Dieppe.

The relative position of the lights of cape La Heve is N.E.  $\frac{3}{4}$  N. and S.W.  $\frac{3}{4}$  S. When viewed from northward they can never be seen in line; and if a single light is seen to the southward, without the land having been previously in sight, it must be either the revolving light on cape Barfleur, the fixed light at Fecamp, or the revolving light of cape d'Ailly. At an equal distance from the land, there is much deeper water about cape Barfleur than near cape d'Ailly. From N.W. to North of cape Barfleur lighthouse at 15 or 18 miles distance, the depth is 35 to 40 fathoms, rotten ground; 9 or 12 miles from the same lighthouse, 28 to 30 fathoms, coarse gravel; and very

The southern tower may be seen at the distance of 15 miles, and the northern one about 12 miles, when the sun shines upon them. They are, however, difficult to distinguish when viewed from a distance N.E. or North from them because of the high land behind, but the land itself presents a remarkable feature in its formation, which aids in pointing out their position; we refer to the valley of the little river Saire (known as the Coupée du Vaast),  $5\frac{1}{2}$  miles S.W. by W.  $\frac{1}{2}$  W. from the lighthouse. Pernelle hill, another prominent object in this locality, is made still more conspicuous by the church on its summit; this church is S.W.  $\frac{3}{4}$  S. 5 miles from the lighthouse, and the hill, when bearing S.S.E., W.S.W., or N.N.W. has the appearance of a promontory sloping to the sea.

*Barfleur Race* is caused by the violence with which the flood and ebb streams run over the rocky flat that extends about a mile East to S.E. from the lighthouse on the cape. The church towers of Pernelle and Monfarville in line are the mark for the outer extremity of this flat. The depth on it is 7 to 40 feet.

The race is dangerous at springs, when the streams rush over the flat at the rate of 8 or 9 knots; with a fresh wind the sea breaks violently upon its whole extent. The broken water in the race, generally speaking, depends upon the speed and time of the tide; it sometimes extends a great distance in an easterly direction from the lighthouse. The sea is much more agitated with spring tides, and is worst with N.E. gales; with néaps, when the streams lose much of their force, the race is not so violent. At slack water, with a moderate wind, the extension of the race is only a strong rippling, and the most turbulent part of it is not more than 200 or 300 fathoms across.

**Roubaril Cove.**—Roubaril Cove, about half a mile westward of cape Barfleur, is the only place between capes Barfleur and Levi where a landing can be effected during fresh northerly winds. Coasters under the care of good pilots can take this place when necessary, and it is said that a vessel could be saved by running into it at high water, providing she is under 12 feet draught. It is a cable deep and half that in width, and the rocks surrounding its shores are always uncovered; the water runs into it at half flood.

**Dangers between Capes Barfleur and Levi.**—These capes are distant from each other 8 miles; the intervening coast is generally low and sandy, and is fronted with dangers, some of which extend outwards to the distance of  $2\frac{1}{2}$  miles. Within and among these dangers there are some winding channels, which are serviceable to small vessels when under the guidance of local knowledge, even at low water. Exclusive of those extending along and from the shore, the outermost and the most dangerous are the following:—

*Banc de St. Pierre.*—The eastern extremity of the Banc de St. Pierre (25 feet

near the shore, 20 to 22 fathoms, coarse brown sand;—at cape d'Ailly, at the same distance of 15 or 18 miles N.W. to N.E. of the lighthouse, the depth is only 20 to 24 fathoms, mixed ground, with pieces of reddish rocks, shells, gravel, and pebbles of various colours; and nearer the shore, between 6 and 12 miles from the same lighthouse, 18 to 20 fathoms, same ground. Vessels may stand in to the depth of 15 or 16 fathoms in the immediate vicinity of the light of cape d'Ailly.

A ship from westward, having recognised the light of cape Barfleur, should not approach it nearer than the depth of 22 or 23 fathoms; and if bound to Havre or the Seine, after having made the two lights of cape La Heve, should tack from North to South, either to wait for daylight or the tide, but should not approach the south land into a less depth than 15 or 14 fathoms. When at the mouth of the Seine, the two lights of cape La Heve must not be brought into line, unless two-thirds of the flood has run.

Vessels leaving Havre for the westward in the night, or in thick weather, should steer about N.W. or N.W. by N., frequently heaving the lead, and keeping, if possible, in not less than 16 or 18 fathoms. The ground between Havre and cape Barfleur consists of small black, red, and grey pebbles (like small beans) with very little sand.



water) is 6 cables N.N.E.  $\frac{1}{3}$  E. from cape Barfleur lighthouse; the bank thence extends north-westerly  $1\frac{3}{4}$  miles to the Plateau des Equets, and consists of sand and broken shells,—the shoalest part, near the centre, is 4 to 6 feet under water. During a weather tide the sea breaks with great violence over the shallow spots.

*Haut Fond des Equets and Plateau.*—The Plateau lies N.W. by N. 2 miles from cape Barfleur, and  $1\frac{1}{4}$  miles from the coast, is of a circular form, about one-third of a mile across, and has several dangerous heads on it, the highest of which dries 2 feet at low water, but the others have from 2 to 5 feet over them. The Haut Fond is half a mile N.N.E. from the Plateau, and N.N.W.  $2\frac{1}{2}$  miles from the lighthouse, and has 27 feet water over it, with 10 and 12 fathoms around.

*Roquette.*—This is a small isolated rock 4 feet under water lying N.W. by N. 3 miles from cape Barfleur lighthouse, and  $1\frac{1}{4}$  miles, N.N.E. from Neville point. There is a rock of 30 feet water just southward of it, and several others of 15 to 22 feet between it and the Renier rock, which is about  $1\frac{1}{2}$  miles further westward.\*

*Renier Rock.*—The Renier uncovers 4 feet, and is situated on the outer edge of a triangular rocky flat, the base of which is towards the shore; the rock is about a mile from the nearest land, and 4 miles N.W. from cape Barfleur; the flat has many rocky heads upon it, which show when the tide is down.

*Renier Shoals.*—These are three distinct patches, bearing the names of South-east, Centre, and North-west shoals; they occupy a space extending one to  $1\frac{1}{2}$  miles N.E. and North from the Renier rock, and the South-east and Centre shoals have 21 and 15 feet water respectively over them. The North-west shoal (the least water on which is 26 feet) is the outermost danger off this part of the coast, being about  $2\frac{1}{2}$  miles from the land; it lies with cape Barfleur lighthouse S.E. by S.  $5\frac{1}{5}$  miles, and the lighthouse on the centre of Cherbourg breakwater W.  $\frac{1}{4}$  S.  $10\frac{1}{2}$  miles.

At about a mile eastward from the North-west Renier shoal there is a spot of 8 fathoms rising abruptly from a depth of 14 and 19 fathoms, and consequently causing eddies that are dangerous to cross during strong winds.

*Sen Rock and Shoals.*—The Sen rock (awash at low water) is five-sixths of a mile from the shore in a N.E. by N. direction from Coqueville church.

The Sen shoals extend one mile eastward,  $1\frac{1}{4}$  miles northward, and half a mile westward from the Sen rock. They form separate patches, and the largest, which lies northward of the rock, is about five-sixths of a mile long and one-third of a mile broad, and has two dangerous rocky heads upon it of  $4\frac{1}{2}$  and  $5\frac{1}{2}$  feet. Northward of this are several patches,  $3\frac{1}{2}$  to 5 fathoms under water, and one of 9 fathoms, which is rendered dangerous only by the heavy sea caused by the eddies.

Between the Sen rock and shoals and cape Levi race there are no other known dangers than those lying off the shore, which in some cases run out two-thirds of a mile, and are steep, there being 6 and 7 fathoms water close to their outer edges.

Unless acquainted with the coast or assisted by a pilot, all vessels should keep outside the foregoing dangers, when sailing from cape Barfleur to cape Levi, by not getting into a less depth than 26 fathoms. On a clear night, a bearing of cape Barfleur light, or of the flashing light at Cherbourg, will assist very considerably in avoiding them, but in thick weather it is best to keep off the coast altogether, as the lead is not a sufficient guide. At the North-west Renier shoal the flood stream begins when it is half-flood by the shore, and ends when it is half-ebb; it attains its greatest speed,  $3\frac{1}{2}$  to 4 knots, at the time of high water, and the ebb at the time of low water by the shore, when their direction is E.S.E. and W.N.W., but nearer the longitude of Barfleur lighthouse

\* La Roquette and the bancs du Sen may probably be buoyed (1863).

the flood inclines more to the S.E., and increases its rate, and the ebb to the N.W. also with greater velocity.

**Mondree Bay** is just eastward of cape Levi; here vessels turning to windward, during westerly winds and with the flood running, may wait a tide and anchor in  $7\frac{1}{2}$  fathoms, muddy bottom, on the western side of the bay, but not unless the weather is fine, for should they be caught with strong north-easterly, northerly, or north-westerly winds, and have to get out during a flood tide, they might be drifted among the rocks and shoals which lie to the eastward.

**Cape Levi Light.**—Cape Levi is on the same parallel, but 8 miles westward of cape Barfleur. It is low, and has a square lighthouse upon it 104 feet high, from which, at 115 feet high from the sea, is exhibited a *fixed* light (*varied every three minutes by a red flash*) visible 12 miles from all parts of the sea horizon. In addition to this lighthouse, there are two houses (very close to each other) on the highest of the little hills immediately within the cape, which may be seen at a moderate distance; one, the northernmost, is an old semaphore, known to seamen as the cape Levi look-out, and the other is a guard-house.

**Cape Levi Race.**—A race is occasioned by the uneven rocky ground, that extends two miles N. by E.  $\frac{1}{2}$  E. from cape Levi, and crosses the direction of the streams of flood and ebb; the eddies it makes produce a heavy sea, particularly during a weather tide. On this rocky flat are the following patches, some of which are dangerous even to small craft:—From the cape several patches of rock dry at low water, extend as far as 4 cables to the north-east; the outermost is terminated by a rock, named Bieroc, which has a rounded head 5 or 6 feet above high water. At about  $1\frac{1}{2}$  cables northward of Bieroc rock is Bieroc flat, 3 feet under water.

Cape Levi flat is likewise small, and has only 13 feet water upon it; it lies N.N.W.  $\frac{1}{2}$  W. half a mile from Bieroc rock. The Black rock, one mile N.  $\frac{1}{2}$  E. from the Bieroc, is 7 feet under water, and consequently very dangerous. The Northern head, with  $5\frac{1}{2}$  fathoms upon it, lies on the northern extremity of the race,  $1\frac{1}{2}$  miles from the Bieroc in the direction of North (a little westerly); the depth around it is 19 to 25 fathoms, and the sea breaks upon it in severe weather. Vessels should pass northward of the race, unless under command of a pilot; then they may, if necessary, pass over the race even at low water, between cape Levi flat and the Black rock, if the weather permit.

In cape Levi bay, three-quarters of a mile south-westward of the cape, a vessel may stop a tide, when bound eastward against easterly winds during the ebb, by anchoring in about 9 fathoms, mud, with the remains of a jetty bearing East or E.S.E.

**Grunes de Bretteville.**—At about 2 miles south-westward from cape Levi there is a reef, named Grunes de Bretteville, which is three-quarters of a mile wide, and extends from the shore northward nearly a mile, at which distance the depth is 10 fathoms. Moderately regular soundings may be obtained on this rocky flat, except in one little spot where there are only 12 feet water; this is about half a mile from the coast, with Bretteville church S.W.  $\frac{1}{4}$  W.,  $1\frac{1}{4}$  miles.

Vessels should avoid getting embayed in the bight formed by the coast between cape Levi and Pelée island.

About midway between Bretteville and Pelée island is Becquet, a small place where boats load with stone from the neighbouring quarries. Here two small *fixed* lights (the outer *white* and inner *red*), when in line lead into the harbour; they are visible about 7 miles.

**Pelée Island, &c.**—Pelée island,  $4\frac{1}{4}$  miles westward from cape Levi, and about half a mile from shore, is nothing more than a bare rocky flat, just awash at high

water. On the western point of the island a fort (fort Imperial) defending the eastern entrance to Cherbourg road, has on its south-west bastion a flagstaff, and on its north-eastern bastion a small *fixed* light, shown at the height of 85 feet, and visible about 9 miles.

A rocky flat extends from the eastern shore nearly all round the island, upon which the depth is 2 to 24 feet. From the northern side of the island this flat runs out 2 cables, to the depth of 24 feet; upon it the sea is always disturbed, consequently it is advisable not to approach its northern edge, but at all times to keep the spire of Querqueville church well open northward of fort Central, the fort on the middle of the breakwater.

Upon this rocky flat the principal dangers under water are the Basse de Hapetout, the North-west point of the flat, La Truite, and the Basse du Chenal. The *Basse de Hapetout* is the north-easternmost danger of Pelée island; it has only  $2\frac{1}{2}$  fathoms on it, and lies E.  $\frac{1}{4}$  N. nine-tenths of a mile from the fort light,—a little westward of it is a patch 19 feet under water. The *North-west point of the flat* has 24 feet water upon it, but immediately within it there are patches of 14 and 11 feet; its position is, we believe, marked by a black buoy (carrying a mast and bell), lying N. by W.  $4\frac{1}{2}$  cables from the light on the fort. *La Truite* is on the western point of the flat, on the eastern side of the eastern channel to Cherbourg; it is small, and the least water over it ( $3\frac{1}{2}$  feet), lies with the fort light bearing S.E.  $\frac{1}{3}$  S. 3 cables, and the eastern end of the breakwater W. by N.  $2\frac{3}{4}$  cables,—a *red* buoy (surmounted by a vane) marks or did mark its position. And, the *Basse du Chenal*, upon which there is as little as half a foot of water, lies in the western part of the narrow and shallow channel separating Pelée island from the main, being distant nearly two-thirds of a mile S.  $\frac{1}{3}$  W. from the light on the fort, and a third of a mile from the land.

Pelée island bank, a sand bank projecting westward from the island, has upon it a depth of 12 to 24 feet at low water. It bounds Cherbourg Great road on the east side, and its western extremity is a quarter of a mile southward of fort Central. Between its western edge and the eastern end of the breakwater vessels of moderate draught can have good shelter.

**CHERBOURG** is about equi-distant from capes Barfleur and La Hague. The Commercial port consists of an outer harbour and a floating basin; the channel into the latter is between two stone jetties, running parallel to each other, and 55 yards apart. The eastern jetty is much longer than the western one, and has on its head a white stone tower, which exhibits a *red fixed* light.

The outer harbour will admit vessels of 15 feet draught at spring tides, and those of 9 or 10 feet at neaps; it, like the entrance channel, dries at low springs, and has on three sides granite-built quays, 328 yards long and 212 wide. The floating basin is 440 yards long and 137 wide, with an area of 12 acres, where above 200 small vessels can be accommodated with shelter. This basin communicates with the outer harbour by gates 42 feet wide. The sill is  $1\frac{1}{4}$  feet above the level of the lowest springs, over which these tides on ordinary occasions rise from 17 to  $18\frac{1}{2}$  feet, and neaps about 13 feet; great springs, perhaps, as much as 19 or 21 feet. On full and change days it is high water at 8h. 2m. The mean duration of the flood is  $5\frac{3}{4}$ h., and of the ebb 6h. 35m. Pilots can always be had to conduct vessels in from the Little road.

The Government dockyard, northward of the town, being appropriated to national vessels, need not be further alluded to.

**Channels.**—Cherbourg roadstead is sheltered on the northern side by the breakwater, a magnificent artificial construction, 4060 yards in length. The channels into it are as follows:—Pelée island, Passe de l'Est, and Passe de l'Ouest.

*Pelée Island Channel.*—This channel is southward of Pelée island, between the



Basse du Chenal and the low-water rocks lining the shore. It is not much more than a cable wide in its narrowest part, is only 2 to 6 feet deep at low water, and is therefore useless to large vessels; even small vessels must be very carefully navigated, and strangers require a pilot.

*Passe de l'Est.*—The *Passe de l'Est* is between the east end of the breakwater and the buoys marking the north-west point of Pelée island flat and Truite rock. Between the Truite rock and the breakwater (the narrowest part of the channel), the distance is  $2\frac{1}{2}$  cables, and the depth 26 to 36 feet at low water. This channel, besides being narrow, has the disadvantage of being crossed in an oblique direction by the flood and ebb streams, on which account it is dangerous to sailing vessels without a commanding breeze.

*Passe de l'Ouest.*—The *Passe de l'Ouest*, the principal channel into Cherbourg roadstead, lies between the breakwater and fort Querqueville. Vessels bound to Cherbourg by this channel always pass between the breakwater and the Basse Chavagnac, a small rocky ridge, midway between the breakwater and the circular battery of Querqueville fort; there is no difficulty in following this route with a leading wind.\*

The channel between the Basse Chavagnac and Querqueville fort is not so wide as that between the Basse and the breakwater, being contracted by the rocks and bank extending from the shore, and ought, therefore, never to be used by large vessels, unless compelled by absolute necessity, and then only between half-flood and half-ebb. A sailing vessel should not attempt it during calm weather, because the eddy caused by Querqueville point during the flood would set her upon the rocks at the head of St. Anne's bay; neither should she hug the shore with an off-shore wind, because, especially with south-westerly winds, it comes in strong gusts from the valleys.

**Anchorage.**—The anchorages recommended are, for large vessels, the Great road and western anchorage; and for smaller vessels the Little road and anchorage between Pelée island bank and the eastern part of the breakwater, already alluded to.

The Great road is limited on the east and north-east sides by Pelée island bank, on its western side by the meridian of Cherbourg church, and on the southern side by the sandy bottom extending from the shore. The holding-ground is good, and it is usual to moor vessels S.E. and N.W., and veer cable to meet the streams of flood and ebb, but as these are mostly weak, it is more advisable to moor with open hawse to the N.W. on account of the frequency of winds from that quarter. Winds fresh from North to N.W. throw a heavy sea into some parts of the road, and those from E.N.E. to E.S.E. send in a heavy swell during the period comprised between half-flood and half-ebb by the shore; but it is sheltered by the breakwater from strong N.N.E. winds. The flood stream begins half an hour after low water by the shore; its rate is about 2 knots, and that of the ebb  $1\frac{1}{2}$  knots.

The western anchorage is 2 cables within the western part of the breakwater; here vessels of all sizes are able to ride safely in from 5 to 8 fathoms, over a bottom of fine sand and broken shells. The flood begins in this anchorage about one hour after low water by the shore; both the streams are feeble.

In the Little road vessels anchor till there is sufficient water for them to enter the Port du Commerce. This road lies in the eddy of the flood and ebb streams occasioned by Homet point, between the jetty and the line where the round battery of Querqueville is just open of fort Homet. The depth at low water is 26 to 16 feet, on mud and sand. Large vessels arriving during neap tides have to wait until they can enter the Port du Commerce; they should, therefore, moor with open hawse to the S.W., with

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\* A fort is being built on the Basse Chavagnac.

the longest scope of cable on the north-west anchor, and if a gale is apparently coming on from northward, a third anchor with good scope of cable should be laid out to the N.E. Care should also be taken to guard against the effects of gales from between the S.E. and S.W., which will otherwise drive the vessel towards the breakwater, where at such times the sea is very much agitated.

The western boundary of the anchorage between Pelée island bank and the eastern part of the breakwater, is the meridian of fort Central, whence it extends eastward to 150 fathoms from the eastern extremity of the breakwater. The depth varies from  $5\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, bottom principally of sand. It is used by vessels seeking shelter from strong N.N.W., northerly, and E.N.E. winds; but they should not bring-to here with those from between W.N.W., southerly, and S.S.E., because the holding-ground is not sufficiently good to withstand their effects.

**Dangers.**—Besides the sunken and other dangers in the approach to Cherbourg roadstead, of which mention has already been made, there are, in the vicinity of the foregoing anchoring places, the Flamands rocks and shoal, Tenarde rock, and the rocks bordering the shore of St. Anne's bay, between forts Homet and Querqueville.

**Flamands Rocks.**—The Flamands rocks lie close to the shore eastward of the Little road, and have a strong fort built upon them. The *Basse des Flamands*, 11 feet under water, lies above a quarter of a mile North from the northernmost dry Flamands rock. By not going eastward of the line where Octeville church is seen just open eastward of Cherbourg church, vessels will avoid it and also the north-west point of the Flamands rocks, upon which is a depth of only 15 feet. Nacqueville and Querqueville churches in line, N.W. by W.  $\frac{1}{2}$  W., lead northward of the Basse des Flamands, in 15 feet at low water.

**Tenarde.**—The Tenarde consists of three small and dangerous heads of rock lying N.W. by W. and S.E. by E. Together their extent is about a cable; on the eastern head the least depth is 9 feet, on the middle one 8 feet, and on the western 15 feet. From the centre of fort Homet the middle head bears N.E., distant 2 cables; between is a depth of  $1\frac{1}{2}$  and  $3\frac{1}{2}$  fathoms. A buoy guards the eastern head of the Tenarde.

The shore of St. Anne's bay is low, and entirely bordered by rocks which uncover at low water; the outermost of these is the Rochefort, but there is a 14-foot rocky patch half a mile from shore, and much in the way of large vessels beating into or out of Cherbourg road, lying N.W. nine-tenths of a mile from fort Homet. The water is shoal throughout St. Anne's bay.

**Lights.**—In addition to the *fixed* light on Pelée fort and the *red* one on the eastern jetty head of the Port du Commerce, already mentioned, the approach to Cherbourg during night is assisted by a small *green* light (visible 2 miles) on the eastern head of the breakwater, and a *red* one (visible 10 miles) on its western head; a *fixed* light (*varied by a flash every three minutes*) shown from fort Central, on the breakwater, at the height of 66 feet above the sea, visible about 10 miles; and a *fixed* light exhibited from a white tower in fort Querqueville at an elevation of 59 feet, and visible also about 10 miles.

**Directions.**—Small vessels should not attempt to enter or leave Cherbourg roadstead by the channel southward of Pelée island, unless with the assistance of a pilot.

Vessels from eastward intending to enter by the *Passe de l'Est* should remember that both the flood and ebb streams set obliquely across its entrance, and on that account, when the flood tide is running, a good berth should be given to the north-west point of Pelée island flat. When within the black buoy marking its position, steer in midway between the breakwater and the buoy guarding Truite rock. The leading mark is Octeville church, behind Cherbourg, S.W. by W. With a westerly wind, and bound eastward, get under way about half flood, or, if in the basin of the

Port du Commerce, leave it as soon as the gates are open, and run out of this channel with the above-mentioned leading mark; when clear of it the young flood will prevail, and if a fresh breeze blow the vessel will continue with that stream 8 or 9 hours eastward. In this channel the flood begins about an hour after low water by the shore; between the breakwater and the Truite rock its direction is E. by S., and greatest velocity  $2\frac{1}{2}$  knots, though just to the northward its direction is East, and rate  $3\frac{1}{2}$  knots, and at the north-west point of Pelée island flat E.N.E. 4 knots. The ebb is more uniform, and its rate is rather less; outside the breakwater and the flat its direction is W.N.W.

The Passe de l'Ouest is not difficult to take with a leading wind. When eastward of cape La Hague at night keep the light on the Gros du Raz rock in sight above the land, until the light in Querqueville fort bears S.S.W., then stand in southward till Pelée island light is seen southward of that in fort Central. If the weather be clear, the red light on the eastern jetty of the Port du Commerce will now be in sight, which brought westward of the upper battery on fort Homet, if it can be distinguished, is the leading mark through the channel. This latter mark, however, should not be depended upon by a sailing vessel in a dark night and with the flood running. Large vessels when beating through must take care to avoid the Basse Chavagnac (the rocky head N.W. nine-tenths of a mile from fort Homet) and the Tenarde rock.

When leaving by the Passe de l'Ouest vessels should not quit the roadstead until the wind is sufficiently settled to carry them clear of the channel; it is usual to go out at the beginning of the ebb. If from the Port du Commerce, or the Little road, after rounding fort Homet, borrow towards the breakwater, to avoid, in light winds, the Basse Chavagnac, as the ebb sets directly over it. In this channel the first direction of the flood, which half a mile outside begins  $1\frac{1}{2}$  hours after low water by the shore, is S.S.W., but as it gains its greatest strength (2 knots at springs), it inclines towards the S.S.E. The direction of the ebb stream varies from N.N.W. to N.W., and its rate is nearly the same as that of the flood.

**THE COAST.**—From Querqueville point, the coast as far as just beyond Urville church, a distance of  $3\frac{1}{4}$  miles, is bordered by a beach of sand, gravel, and rocks, which uncovers at low water, and extends in several places as much as 3 or 4 cables from the land. Outside this beach a rocky bank, with irregular soundings, extends off about a mile;—of this bank, the part between the bearings of N.E. and North from Urville church, known as the Raz de Bannes, has several rocks upon it, uncovering at low water, the highest as much as  $4\frac{1}{2}$  feet; there is also a 5-foot patch close to the north-west extremity of the bank, half a mile N.W. of the highest low water rock.

*Basse de Mermistin.*—The Basse de Mermistin, a shoal of 7 to 8 fathoms, and with a depth close to it all round of 10 to 15 fathoms, lies  $1\frac{1}{4}$  miles from the coast. From its eastern end Urville and Nacqueville churches appear in line, whence it extends westward a third of a mile, and is about  $2\frac{1}{2}$  cables broad.

**Omonville.**—Omonville is distant  $8\frac{1}{2}$  miles N.W. by W. from fort Central, Cherbourg, and lies in a slight indentation of the coast about a mile south-eastward from Jardeheu point. It is a very small place, sheltered from all winds between S.E., westward to N.N.W., and contains a depth of 7 and 5 fathoms, gradually shoaling towards the beach, the bottom being of rock and mud. A ledge of rocks on its northern side protects the harbour from winds between North and East, except when it is covered, at which time a heavy sea usually rolls in. At about half a mile S.S.E. from Omonville fort (on the point southward of the entrance) there is a rocky ledge running out about a quarter of a mile from the shore, that must be guarded against when approaching this part of the coast, otherwise the shore for  $2\frac{1}{2}$  miles south-eastward of Omonville is moderately bold-to.



*Foireuse, Coque, and Brefort Rocks.*—These all lie off Jardeheu point. The first is nearly three-quarters of a mile northward of Omonville harbour, and is on a rocky flat, the eastern extremity of which (in 24 feet, half a mile from the shore) rises from a depth of 18 and 23 fathoms, where the church tower of Digulleville is seen a quarter of a point open south-eastward of Omonville church tower: the highest rocks on this ledge are 8 feet high when the tide is down, but the rounded summit of the Foireuse is 2 feet above the level of the highest tides. The Coque is a remarkable rock one-third of a mile East of point Jardeheu; it rises three feet above high springs, and has a rocky ledge running from it to the N.N.E. 3 cables, with only 5 fathoms over its outer part, causing violent eddies, which small vessels must avoid. The Brefort shoal ( $2\frac{1}{2}$  feet under water) is extremely dangerous to coasting vessels; it lies half a mile N. by E.  $\frac{1}{2}$  E. from Jardeheu point, and a similar distance N.N.W.  $\frac{3}{4}$  W. from the Coque rock.

**St. Martin's Bay** is between Jardeheu point and the Herbeuses rocks, which lie about 2 miles eastward of cape La Hague. From Jardeheu point to the middle of the beach at the head of the bay the shore is bordered by rocks that dry at low water, and outside of these rocks are others lying in separate groups, the most remarkable being the Martiauroc and the Esquina. Several rocks (above and under water at low tide) extend half a mile to the N.W. of the Martiauroc, and form a sort of causeway terminated by a rock, which is 3 feet under the surface at low water.

The Herbeuses are large rocks 30 to 40 feet above high water, forming a kind of prolongation of the western point of the bay to the N.N.E. for a distance of nearly a third of a mile; very shoal patches lie to the S.S.E., E.S.E., and N.E. from these rocks.

The entrance to the bay is about three-quarters of a mile broad, between the Herbeuses and the Martiauroc, but the only channel by which vessels can enter and get to the anchorage under the fort on the western side of the bay, without a pilot, is barely a quarter of a mile wide, and lies between the before-mentioned 3-foot rock, and the shoals extending 1 to  $1\frac{1}{2}$  cables around the Herbeuses.

St. Martin's bay is open to winds from N.E. to N.W., which throw in a heavy sea when they blow with any strength, but the anchorage under the fort, which is tolerably good, will afford shelter to small craft from winds between W.N.W. southward to S.S.E.

**CAPE LA HAGUE.**—The coast from St. Martin's bay to cape La Hague is composed of pebbles and irregular rocks that uncover at low water. The depth around the cape is very irregular, whence proceed the violent eddies in its vicinity, which are caused by the great mass of water flowing towards it during the north-eastern stream.

**Light.**—Cape La Hague is low and sandy, but the lighthouse on the Gros du Raz rock, half a mile westward of its extremity, is a conspicuous object by day, and during night serves to point out the locality by showing an excellent *fixed* light, at an elevation of 154 feet above the sea, visible in clear weather at the distance of 18 miles. This light has the advantage of being rarely obscured either by fog from the land or mist from the sea; its geographical position is lat.  $49^{\circ} 43' 22''$  N., long.  $1^{\circ} 57' 21''$  W.

**Rocks.**—From St. Martin's bay around the cape to about  $1\frac{1}{2}$  miles southward of the lighthouse on Gros du Raz rock, the coast is skirted by many dangerous rocks, which are rendered additionally formidable by the great violence of the tides in their neighbourhood. In fine weather, and with other favourable circumstances, pilots occasionally take vessels, under 15 feet draught, along the shore within these rocks, for then the tides are less rapid and the sea less agitated there than in the Race of Alderney. The principal of these dangers are the Fliart, Houfflet, Ronde, Becchue, Grunes, Foraine, Diotret, and Greniquet rocks.

*Fliart Rock.*—The Fliart shows 11 feet at low water, and lies not quite a quarter of a mile N.N.W. from the Herbeuses rocks, on the western side of St. Martin's bay; shallow patches with 6 feet water on their outer extremity extend a third of a mile E. by N. from it. This danger is marked by a buoy.

*Houffet.*—The Houffet shoal is the outermost of several shallow spots lying off this part of the coast; it has  $5\frac{1}{2}$  fathoms water over it, and lies E.  $\frac{3}{4}$  S. from the lighthouse on Gros du Raz, and N.E. by N. from the church of St. Germain de Vaux (a building with a square tower surmounted by a spire). It is two-thirds of a mile from the nearest part of the shore, and is dangerous on account of the high sea occasioned by the eddies.

*Ronde Rock.*—The Ronde rock lies at the extremity of the rocks near the shore that uncover, and is in the shape of an oven, showing five feet above low water. It bears from the lighthouse E. by N.  $\frac{1}{4}$  N. distant  $1\frac{1}{4}$  miles, and is half a mile from the nearest land.

*Becchue.*—The Becchue is the northernmost of all the rocks that do not cover between St. Martin's bay and the lighthouse, and its top is 4 feet above high spring tides. It bears E.  $\frac{2}{3}$  N. from the lighthouse, and is 4 cables from the shore. A number of rocky heads appear at low water all round the Becchue for a distance of a quarter of a mile.

*Grunes.*—The Grunes, two in number, are known as the Great Grune and the Little Grune. The latter is a reef a quarter of a mile long from N.E. to S.W., upon the middle of which are two rocky heads, showing about a foot of surface at low water; from it the lighthouse bears S.W. by W. about one mile distant. The Great Grune lies N. by W.  $5\frac{1}{2}$  cables from the extremity of cape La Hague, and 7 cables N.E.  $\frac{3}{4}$  N. from the lighthouse; it is extremely dangerous, having only 2 feet water upon it, and the sea breaks with great fury over it, as also over the Little Grune, during a weather tide. Between the Great Grune and the lighthouse (at about half a mile N.N.E.  $\frac{1}{4}$  E. from the latter) there is a sunken rock, named Galet, with only a foot upon it at low water.

*Foraine.*—The Foraine lies five-sixths of a mile W.  $\frac{3}{4}$  S. from Gros du Raz lighthouse, is of a conical form, 13 feet high at low water, and is the westernmost of the rocks surrounding cape La Hague. Between it and the lighthouse the space is filled with numerous rocks and shoals, known as the Noire (Black) rocks. The Foraine is considered by the seamen of this locality as a half-tide rock, and is of great service to them, for as soon as it is covered the flood stream begins to be felt in the Race of Alderney, and the ebb stream directly it is uncovered. The tide sets directly on it, so that it is very dangerous to vessels passing in its neighbourhood.

*Diotret and Greniquet Rocks.*—The Diotret and Greniquet rocks are south-eastward of the Foraine, the former, which is 25 feet above low water, being distant 6 cables from it; and the latter (a large rock 15 feet above high water and 3 cables from the shore) S.E. by S.  $\frac{1}{2}$  S. distant nine-tenths of a mile.

*Fosse de la Hague.*—This remarkable deep commences 3 miles W.N.W. from Gros du Raz lighthouse, whence it trends north-eastward and eastward round the cape, and terminates on the meridian of Jardeheu point, the eastern point of St. Martin's bay, at  $3\frac{1}{2}$  miles from shore. The depth in it varies from 36 to 58 fathoms, and soundings of 30 to 34 fathoms can be obtained on all sides of it, except at its western end, where the depth is 17 fathoms.

Vessels from eastward running along the coast between Cherbourg and cape La Hague, are liable to be drawn into the Race of Alderney unless they keep at least 7 or 8 miles from the shore. This may be avoided by keeping one or two miles northward of the line of the two windmills on Alderney in one; for in about that

direction the separation of the streams of ebb takes place, namely, that running towards the Race, and that which passes to the north of the island. In clear weather the windmills are said to be visible from a distance of 15 miles. When overtaken by a calm, it is recommended to anchor, if within the above distance from the land; the best place is said to be in about 20 fathoms, a little northward or north-eastward of the Basse de Mermistin, which, as before stated (page 161), lies one mile from the shore, immediately westward of the line of Urville and Nacqueville churches in one.

The north-eastern stream of tide, between half flood and low water on the shore, sets very strongly round cape La Hague, which must be remembered when approaching that headland from westward. Flamanville church (on cape Flamanville, 12 miles southwards of cape La Hague), seen exactly halfway in the interval which separates that cape from the Nez de Joubourg (3 miles S.S.W. from cape La Hague), will lead a sufficient distance westward of the cape, to remove any apprehension of being drawn by either stream among the rocks in its vicinity.

### ALDERNEY, THE CASQUETS, AND SCHOLE BANK.

**RACE OF ALDERNEY.**—The channel between cape La Hague and Alderney, is known as the Race of Alderney (the Raz Blanchard of the French). The strength of the stream through it, when running south-westward during spring tides exceeds  $6\frac{1}{2}$  miles per hour, and during neaps is nearly five miles. The north-eastern stream runs with even greater rapidity. In boisterous weather, if the wind and stream be ever so little obliquely opposed, the sea breaks in all parts of it, as if over small knolls or patches, although the depth throughout is not less than 20 fathoms. Vessels passing through the channel with a leading wind, should steer in midway, bearing in mind that the north-eastern stream of tide, between half flood and high water, sets strongly round cape La Hague, and over the numerous sunken rocks in its vicinity.

**ALDERNEY** is only  $3\frac{1}{2}$  miles in length from east to west, and  $1\frac{1}{4}$  miles across where broadest, which is at its south-western end. Upon it is a hill with a windmill 305 feet above the sea, whilst Telegraph hill (at the south-west end of the island) is 9 feet lower. Its N.E. extremity lies W.N.W. from cape La Hague, from which it is distant  $8\frac{1}{4}$  miles. Alderney is difficult of approach by reason of the numerous rocks surrounding it, some of which are under water; and the danger is greatly augmented by the peculiar set and velocity of the tides. There are two small towns, St. Anne (on the heights, in the western part of the island), and Braye (behind the harbour).

**Braye.**—The breakwater on the north shore of Alderney (now nearly completed) encloses the old harbour of Braye, and the anchorage in the roadstead fronting it. The rocks at one time encumbering the harbour thus formed have been removed, and the anchorage is now quite clear, but on account of the rocky nature of the bottom, vessels should always ride with a good scope of cable in strong winds. The shelter is from northward and westward; easterly winds send in much sea.

The breakwater commences at the west point of Braye bay, and extends 1609 yards eastward. Owing to repeated alterations and extensions of the original plan, it has not been constructed in a straight line, but as follows:—From Grosnez point straight for 1000 yards N.  $74^{\circ}$  E., then a curve northward for 173 yards in a radius of 500 yards, after which it runs straight to the end, N.  $54^{\circ}$  E., for the distance of 436 yards. It is built on an artificial bank of rubble stone or *pierres perdues*, the main part is 40 feet wide and 6 feet above high water at ordinary springs; on its outer part there is a promenade 10 feet in width and 21 feet above high water, and on the outer part



of the promenade a parapet 4 feet wide and 25 feet above high water. It has been run across the Bouillonnaise and Malassise rocks, and its centre passes a cable southward of the Braye rocks. At its upper end there is a slipway for boats and small craft, with steps at the end descending to low water of spring tides; there is also a flight of landing steps within at the distance of 930 yards from the shore. Its inner part now is wholly clear, and the rubble bank on which it is built is so steep that large ships may securely lie alongside at the distance of 50 feet. Mooring chains and bollards have been provided, and there are also iron ladders from low water to the quay level, at short intervals along its entire length.

A *black buoy*, moored in deep water off the end of the breakwater, guards its outer limit; the passage between this buoy and the end of the wall should not be attempted.

*Lights*.—Two *fixed red* lights at the head of the harbour, if brought in one, mark the fairway channel during night. The lower light is exhibited through a long tube which screens it in every direction excepting on a line through the middle of the fairway; this light is on the parapet of the old pier at Braye, and 25 feet above high water at spring tides,—it may be seen at the distance of 5 miles in clear weather. The upper light is at the north-east corner of Braye reading-room, S.W. by W., 370 yards from the lower light; it is 55 feet above high water, and may be seen at the distance of 8 or 9 miles.

*Directions*.—The leading day mark into the harbour is the tower of St. Anne's church in line with the outer end of the pier of Braye old harbour, S.W.  $\frac{1}{2}$  W. At night vessels should run in with the lights in line S.W. by W., making careful allowance for the set of the tide.

Vessels approaching from northward and westward should not bring the Casquets northward of West until the harbour lights are in one, when they must run in as before. If from eastward, cape La Hague light should not be brought eastward of S.E. by E., until the harbour lights are in line, when they must steer in as before.

When approaching the harbour it is necessary to have the harbour lights *exactly* in line before shutting in the Casquets light with Burhou island. When near high or low water springs, the stream sets *across* the entrance of the harbour with great velocity, and great caution is then necessary in entering; the bearing of the upper light should never be altered more than a quarter of a point on either side, or the lower light lost sight of, to ensure avoiding the rocky patches outside the Aiguillons on the one side, and the toe of the breakwater on the other.

**Longy Bay**.—Longy bay, on the south-eastern side of the island, dries at low water neaps. The time of high water and the rise and fall are nearly the same as at Braye, or any other part of Alderney. Fronting it is an islet, named Raz, which is connected with the land by a causeway of large irregular stones, that becomes dry at 2 hours' ebb. The entrance to this bay is not more than 200 fathoms in breadth, with a rock (which dries at low water, great spring tides) in the fairway, and as both ebb and flood set violently across, the channel in is very difficult, as well as hazardous, to attempt. The best time to enter is between 2 and 5 hours' ebb, and with the wind between N.W. and S.W.; the vessel may then be run aground, and on the succeeding tide hauled up under Essex nunnery. The leading mark in with the above winds is Essex nunnery (on the sandy beach at the western side of the bay), just shut in westward of Queslingue rock, and by borrowing within half a cable of the latter rocky point the sunken rock in the fairway of the entrance will be avoided. Longy bay affords no shelter whatever against S.E. and southerly winds, unless to a vessel laid on shore by a high spring-tide, and consequently above the effects of the breakers.

**DANGERS AROUND ALDERNEY**.—The dangers around Alderney are numerous. Those most to be apprehended on the north-eastern and eastern sides of the island are the Grois, Platte, and Sauquet, on the former; the Blanchard

Boufresses, Brinchetaie, Raz, &c., on the latter. As the first three are all within half a mile of the shore, vessels may clear them, as well as all the dangers in their vicinity, by not approaching the island nearer than when the Casquet lighthouses bear W. by N., when they will be open northward of Burhou islet. The Blanchard and the Raz, with a spot of 18 feet nearly midway between them, are the outermost of the dangers off the eastern end of the island. The *Blanchard* lies S.E. by E.  $\frac{3}{4}$  E.  $8\frac{1}{2}$  cables from the fort on Quenard point, has on its outer part only 12 feet water, and between it and the shore are several shoals and rocks surrounded by a depth of 9 to 12 fathoms. The *Raz*,  $1\frac{1}{4}$  miles southward of the Blanchard, has 18 feet water upon it, and is distant nearly  $1\frac{3}{4}$  miles from Quenard point in a S.S.E. direction, and 7 miles W. by N. from the lighthouse at cape La Hague.

To pass at a safe distance southward of the dangers on the south-eastern side of Alderney, the lighthouse at cape La Hague should not be brought southward of E.  $\frac{1}{2}$  S.; or, keep the Casquet lighthouses open southward of Alderney.

On the south, south-western, and western sides of Alderney the principal rocks are the Bonit, Coque-Lihou, Noires-Putes, Orbouée, Etacs, and Pierre-au-Vraic; the outermost of these, except the Pierre-au-Vraic, is the Noires-Putes, a cluster of high rocks, S.W.  $\frac{1}{3}$  S. from the old telegraph tower, and about three-quarters of a mile from the shore. The *Pierre-au-Vraic* (a rock dry at low springs, and from its position a very formidable danger) is small and with a depth close to it on all sides of 8 to 17 fathoms; it lies 2 miles West from the western extremity of Alderney, and both ebb and flood set very strongly over it. The *Bonit* is small and dangerous, drying 2 feet at low spring-tides; it lies nearly half a mile from the shore, with a beacon on the island almost in one with the slope of the summit of the rock l'Etac de la Quoiré (a rock close off the island) bearing N.N.E.  $\frac{1}{4}$  N. On this side of the island, at the distance of one to  $1\frac{1}{2}$  miles, there is a large bank known as the South bank, upon which is a depth of 6 to 10 fathoms; over it is generally a ripple,—cape La Hague lighthouse E.  $\frac{1}{4}$  S. leads southward of it.

Vessels beating round the west end of Alderney should not approach it nearer than one mile.

Like the other sides of Alderney, the north and north-western are encumbered with numerous rocks; by keeping, however, beyond the distance of three-quarters of a mile from the island when passing through the Swinge, they will all be avoided. The outermost of the rocks are named Corbet and Barsier.

**BURHOU ROCKS.**—About  $1\frac{1}{4}$  miles northward of the western part of Alderney is the eastern part of a cluster of rocky islets, named Burhou, which have channels between them for small vessels. At their western end is the Ortac, a steep rock 99 feet high, like a hayrick in appearance, distant  $1\frac{1}{3}$  miles W.  $\frac{1}{2}$  N. from Burhou, the largest of the islets; the northernmost of the cluster is the Verte-tête. Westward of the Ortac, as far as 2 cables, are some patches of rock 9 to 14 feet under water.

The whole of the Burhou islets and rocks may be cleared on their northern side, if the Casquets lights are kept open northward of the Verte-tête; when they are their apparent breadth open of that rock they bear W.  $\frac{1}{2}$  N.

**The Swinge.**—The narrowest part of the Swinge, which is between Burhou islet and the Corbet rock, is scarcely three-quarters of a mile wide. Vessels passing out of, or approaching the channel from westward, must be careful to guard against the Pierre-au-Vraic, over which the tides set very strongly. There are two overfalls in the channel which are very dangerous for open boats; between half-ebb and half-flood they are on the south-western side of the narrow part, and during the other 6 hours on the north-eastern side. Burhou islet should not be approached within 2 cables, nor the Corbet rock within one.

**Anchorage at Alderney.**—Vessels occasionally anchor on the south side of

Alderney, at about  $1\frac{1}{2}$  cables from the shore, midway between Longy bay and the rock l'Etac de la Quoiré in 7 to 10 fathoms, sand, gravel and shells, where they are sheltered from North and N.W. winds; also three-quarters of a mile further westward, in 10 to 16 fathoms, sand, rock, and shells. They may likewise anchor south-westward of the Noires-Putes, in 5 to 12 fathoms, coarse sandy bottom, with those rocks distant about 4 cables, and in line with the Telegraph, and be sheltered from easterly winds; also south-westward of the Etac, at the distance of 400 fathoms, in a similar depth over the same description of bottom. At all these anchorages strict attention must be paid to wind and tide. The last mentioned places are preferable to the first on account of the ground, as well as from the known duration of an easterly gale when it sets in during the winter season; but the dangerous Pierre-au-Vraic must not be forgotten. As the sea will seldom hurt a good ship when properly managed, it is always more advisable to gain sea-room in bad weather than anchor on the coast of Alderney, unless under very peculiar circumstances.

**CASQUETS ROCKS and LIGHTS.**—Nearly  $7\frac{1}{4}$  miles W. by N.  $\frac{3}{4}$  N. from Alderney harbour of refuge lie the Casquet rocks, between which and Ortac rock is the strait known as the Ortac channel. This channel during spring tides abounds with broken water (even in the calmest weather), produced solely by the rapidity of the tides, and occasionally the whole space between Ortac and the Casquets assumes the appearance of a continued reef of rocks. The Casquet rocks are bold-to. A little more than a mile S.E. by E.  $\frac{3}{4}$  E. from them there is a rock named l'Equêt, whose northern head dries 7 feet at low water, whilst about midway between is the Fourquie rock, which dries 13 feet at low water and is steep-to; these rocks and the sunken ledges in the immediate vicinity of Ortac, were believed until recently to be the only dangers in the Ortac channel; but a rock 21 feet under water,\* named, appropriately enough, Danger rock, has been discovered in the middle of the channel, almost equidistant from the Casquet lighthouses and the Verte-tête, on a line drawn between them,—from it the Casquet lighthouses bear W.  $\frac{1}{2}$  N. and Ortac rock S.E.  $\frac{1}{2}$  E. A shallow spot on Pommier western bank is also a formidable danger.

On the largest and highest of the Casquets there are three stone lighthouses in a triangular position with respect to each other, each of which exhibits a *revolving* light, attaining its great brilliancy every 20 seconds. The bearings of the lighthouses one from the other are as follow, viz.: from the south-eastern to the north-western lighthouse N.W.  $\frac{3}{4}$  W.; from the north-western to the north-eastern E.  $\frac{3}{4}$  N.; and from the north-eastern to the south-eastern S.W.  $\frac{1}{2}$  W.—they consequently appear as two lights when viewed in either of these three or in the opposite directions. The lights are all at the same height, about 113 feet above the sea, and they are visible from all parts of the sea horizon at the distance of 16 miles. A bell is sounded during foggy weather.†

**Pommier Banks.**—These are two banks on the western side of the Ortac channel, the western end of the westernmost of which is nearly  $1\frac{1}{2}$  miles E. by N.  $\frac{1}{2}$  N. from the Casquet lighthouses. The depth over the eastern bank is 5 to 8 fathoms; over the western  $2\frac{1}{2}$  to 5 fathoms. Both are steep, and in bad weather from north-westward

\* There may possibly be a less depth over it than 21 feet.

† “The great strength of the tidal stream near the Casquet rocks renders an incautious approach to them during foggy weather extremely hazardous; it is therefore recommended at such times *never* to run for them *with* the tide, but either to wait for slack water, or until the stream in its usual rotatory course turns from the desired direction, or by altering the position of the vessel, astream of the rocks to leeward so as to approach them *against* the tide. Should a shoal cast be obtained when running for the Casquets in thick weather, the vessel's head should be *at once* turned against the tide; after which, haul out cautiously to the westward into deep water.”—Commander JOHN RICHARDS, R.N.



the sea breaks violently over them. The 13-foot patch, at the western end of the western bank, has deep water close to it on all sides, especially the western; it lies E. by N.  $\frac{1}{8}$  N.  $1\frac{1}{2}$  miles from Casquet lighthouses (with the north-east and south-west lighthouse in one), and between the bearings of Ortac rock and the Telegraph tower on Alderney in one, S.E., and Ortac rock and the brick kilns on Alderney in one, S.E.  $\frac{1}{4}$  E.—the arc subtended by these two bearings is  $3^{\circ}$ .

Vessels should not attempt to run through the Ortac channel from northward with an ebb-tide except in cases of emergency, nor without a permanent breeze of wind; a thorough knowledge of the tides is also requisite. With the north-eastern stream and a leading wind danger need not be apprehended, as the stream tends more northward after passing Ortac rock, and, acting as an off-set, assists in clearing the Burhou rocks.

**BANKS BETWEEN ALDERNEY AND GUERNSEY.**—Between Alderney and Guernsey are the Casquet South-south-east bank, the Casquet South-south-west bank, the Casquet Middle bank, the Casquet South-west bank, and the Schole bank.

**Casquet South-south-east Bank.**—This bank lies between S.S.E.  $\frac{3}{4}$  E. and S. by E.  $\frac{1}{4}$  E. from the Casquets, distant  $3\frac{1}{2}$  miles. It is of small extent, and has over it a depth of 4 to 10 fathoms, coarse sand and shells, and close to it on all sides about 15 fathoms, which rapidly increases to 20 fathoms.

The 4-fathom patch lies near its south-east end, with the north-east Casquet lighthouse bearing N.  $\frac{1}{2}$  W. (nearly), distant  $3\frac{1}{2}$  miles; and Alderney telegraph tower E.  $\frac{1}{2}$  N.

**Casquet South-south-west Bank.**—The north point of this bank (18 fathoms) bears S.W.  $\frac{1}{2}$  S.  $1\frac{1}{2}$  miles from the Casquet lights, and thence the bank extends due South rather more than  $1\frac{1}{2}$  miles, after which the depth increases and it turns off eastward. It is a quarter of a mile broad (within the limit of 20 fathoms) and has a sharp ridgy apex of fine white sand 11 to 13 fathoms under water, the 11 fathoms part being near its middle.

**Casquet Middle Bank.**—This bank lies about midway between the northern parts of the South-south-west and South-south-east banks. It is about a third of a mile in diameter, and has over it a depth of 15 to 20 fathoms, gravel and broken shells.

**Casquet South-west Bank.**—The north end of this bank (20 fathoms) is 2 miles W. by S.  $\frac{3}{4}$  S. from Casquet lighthouses; thence the bank extends nearly 4 miles S. by W.  $\frac{3}{4}$  W., and is nearly a mile wide. The bottom is of fine gravel, sand, and shells.

The most elevated part of the bank is close to its western side, near the middle; the 10-fathom contour line here includes a space just 2 miles long, and barely a quarter of a mile wide, the shoalest part on which (4 fathoms) lies half a mile within, or north-eastward of its south-western end. From this 4-fathom spot the north-east Casquet lighthouse N.E.  $\frac{1}{4}$  E.,  $4\frac{1}{8}$  miles; Alderney telegraph tower E.  $\frac{1}{4}$  S., and Doyle column in line with the north-east extremity of Guernsey, S.W.  $\frac{2}{3}$  S.

Doyle column in line with Vale Mill, S.W. by S., leads rather more than a mile westward of the bank. The channel between this and the South-south-west bank is 2 miles wide, and 22 to 29 fathoms deep.

**Schole Bank.**—The north end of the Schole bank (10 fathoms) lies  $6\frac{1}{2}$  miles S. by W.  $\frac{3}{4}$  W. from the telegraph tower at Alderney; 13 miles W. by S.  $\frac{3}{4}$  S. from the lighthouse at cape La Hague; and 12 miles N.E.  $\frac{1}{2}$  E. from the highest part of Serk. The bank thence extends S.S.W.-ward about  $2\frac{1}{4}$  miles, and has on its shoalest part (near the middle) a depth of only 12 feet at low water spring tides. Its sides are steep, for the lead falls at once from 7 or 10 fathoms into 18 or 20 fathoms. In bad weather the sea breaks heavily over it.

The Schole bank lies nearly in a line from the middle of the Race of Alderney to the Great Russel channel. Between low water and half-flood it is advisable to pass east-

ward of it, and between half-ebb and low water westward of it, because in both instances the tide will favour the attempt.

Commander JOHN RICHARDS, R.N., says, "The Schole bank, like most other banks between the Channel Islands, consists of a mixture of fine gravel, sand, and shell; it is very steep on the south and west sides, but shoals gradually on the north-east side.

Taking the 5-fathom line as the first contour of the bank, it is  $1\frac{1}{2}$  miles long (in a N. by E. and S. by W. direction) and a quarter of a mile wide near the middle, tapering off to a mere ridge at the extremes. The 10-fathom contour of the bank includes a space  $2\frac{1}{3}$  miles long (N.N.E. and S.S.W.) and three-quarters of a mile wide; and the 20-fathom contour will include a length of 5 miles by  $1\frac{1}{2}$  miles. The top of the bank is very narrow, and consists of small semicircular ridges of sand (convex to the S.W.), the general depth over which is 3 fathoms at the lowest spring tides; near the middle of the bank, however, as little as 2 fathoms was found, having some spots near with  $2\frac{1}{2}$  fathoms.

The soundings taken at different periods tend to prove that its apex is continually varying in altitude, and it is probable, therefore, that it also shifts its position (within a particular and limited space) according to tide, weather, &c. The position of the shoalest spot on the bank had not altered *perceptibly*, however, from 1861 to 1869. The marks for this shoalest spot are Alderney telegraph tower N.N.E.  $\frac{1}{8}$  E.,  $7\frac{3}{4}$  miles; Casquet lights N. by W.,  $10\frac{1}{2}$  miles; and Serk windmill S.W. by W., 10 miles."

#### GUERNSEY, HERM, JETHOU, SERK, &c.

**GUERNSEY.**—The island of Guernsey, 17 miles from Alderney in a W.S.-westerly direction, is in shape nearly that of a right-angle triangle, its north-west side forming the hypotenuse, the length of which is about 7 miles. The land on its south side is remarkably high and steep, whence it gradually decreases in height to its north end, where in some places it is very little above the sea. It is encompassed with many very dangerous rocks, the principal of which are the Hanois, Grunes, and Sambule, on the west and north-west sides; the Brayes, with several others on the north side; and on the East and N.E. sides are the islands of Herm, Jethou, &c. which are also surrounded by numerous rocks and ledges. Vessels therefore approaching the island on its north-west and west sides should not get nearer it than 3 miles at least, nor the south coast nearer than  $1\frac{1}{2}$  miles; the small local craft, whose masters are acquainted with the set of the tides, can approach it with safety much closer.

**Hanois Rocks and Light.**—Upon the south-western rock of the Hanois group, at the west end of Guernsey, there is a round tower of grey granite 117 feet in height from base to vane, which exhibits a *revolving red* light (attaining its greatest brilliancy every forty-five seconds) at 100 feet above high water spring tides, visible at the distance of 12 or 14 miles in clear weather. The light is shown over an arc of  $303\frac{3}{4}^{\circ}$  (E. by N. northward, westward, and southward to S.E.). On the S.E. bearing it is hidden by Pleinmont point, and this bearing passes  $3\frac{1}{2}$  miles south-westward of L'Etac de Serk, and over the south-west end of the Pierres de Lecq (Jersey).

The water is deep to within a quarter of a mile of the west side of the lighthouse, but dangerous rocks extend from it in a S. by W. direction to the distance of a third of a mile; also N.N.W. from it three-quarters of a mile; and northward one mile. Les Grunes de l'Ouest (a rock that dries 10 feet in height at low water springs, and which has hitherto been considered the northernmost danger off Guernsey) lies N.E.  $\frac{3}{4}$  E., distant 5 miles from the lighthouse; but several rocks have recently been discovered in its vicinity, and there may be others at present unknown,—one of these,

the Boue Blondel, has only 5 fathoms on it at low water, and bears from the light-house N.N.E. distant  $3\frac{1}{2}$  miles.

On account of the rocks just mentioned, vessels bound to Guernsey from westward should not approach the island in thick weather within the depth of 40 or 38 fathoms, unless their position has been previously well ascertained. With light winds caution is necessary to avoid being set towards it by the flood stream.

Until some means are adopted of marking the outermost of the reefs off the north-west side of Guernsey, vessels passing westward of it at night should not bring Hanois light westward of South until the Casquet lights bear E.N.E.

From Hanois lighthouse, the nearest part of Pleinmont points S.E. by E.  $\frac{3}{4}$  E. distant one mile; the Casquets N.E. by E.  $\frac{1}{6}$  E.,  $21\frac{1}{2}$  miles; Corbière rock, Jersey, S.S.E.  $\frac{2}{3}$  E.,  $23\frac{1}{2}$  miles; and the lighthouse on Roches Douvres S.W. by S., 20 miles.

**ST. PETER PORT HARBOURS.**—The small tidal harbour of St. Peter Port,  $4\frac{1}{4}$  acres in area, is enclosed by piers of masonry 35 feet high, with an entrance 80 feet wide, facing the east. The depth at high water springs between the pier-heads is  $24\frac{3}{4}$  feet, and  $14\frac{3}{4}$  feet at neaps; the average depth along the quays on the same tides being respectively 20 and 10 feet. South-eastward of the harbour stands Cornet castle, now connected with the mainland by a massive granite causeway.

The new harbour works comprise two esplanades, one on each side of the old harbour, running parallel with the sea front of the town, and averaging together 2500 feet in length and 150 in breadth. From these esplanades spring two breakwaters, one on either side, and equi-distant from the old harbour; being 2500 feet apart at the base, and projecting eastward, so as to enclose the natural sandy bay in front of the town.

The south or Castle breakwater is carried across the rocky isthmus, by which, at low water springs, Cornet castle is connected with the main, and terminates at the north-west bastion of the castle, being 1900 feet in length. The southern face of this breakwater consists of an upright wall and parapet, constructed of rough masonry, and carried to a height of 15 feet above the highest tides. Along this is constructed a level roadway and footpath 40 feet wide. On the north side and under the lee of this arm a floating dock is in course of construction, having an area of 10 acres, and a length of 2675 feet of quays, which are 84 feet wide.

It is intended that the level of the water in this dock be retained to that of the lowest high-water neaps, which on those tides will give 18 feet on the sill and along 1425 feet of the quays; the remaining 1250 feet having a depth of only 14 feet. The width of entrance will be 50 feet, and the depth on the sill and along the deep berths 28 feet at high-water springs; in which event, and until the tide falls to the constant level, the gates will be open and the docks simply treated as an open harbour. Between the dock and Cornet castle it is proposed to construct ship-building yards, having two slips, each 250 feet long and 100 feet wide, which will admit of four vessels being simultaneously constructed, ranging from 1500 to 2000 tons burthen. Farther, on this side, a rough stone breakwater projects 600 feet eastward, from the north-east salient angle of Cornet castle, and adds greatly to the shelter of the harbour, as well as the security of the anchorage in the Little road.

The north or St. Juliens breakwater begins on the north side of the old harbour, at the extremity of the new esplanade, and extends in an easterly direction about 1300 feet (or as far as the head of the Blanche rock) whence it is intended to construct a pier, in the direction of Cornet castle, which will admit of steamers lying alongside at all times of tide, and completely shelter the pool within,—the end of this pier will be in 12 feet water at the lowest spring tides.

Eastward of the north esplanade a pier runs off from the angle of the old north pier, and encloses a careening hard 300 feet long and 150 feet wide, for repairing



vessels. At its entrance, an excellent tidal berth 150 feet in length has been constructed, having 14 feet water at neap tides; and it is intended here to erect masting sheers.

The works above described enclose a space (exclusive of the areas of floating dock, old harbour carenage, &c.) of about 57 acres, the entire of which is covered at low water neaps. Of this space, 20 acres have a depth of 10 to 22 feet at low water neaps, and 20 to 32 feet at high water. At low water springs only 20 acres of the 57 remain covered, and of this, 15 acres have a varying depth of from 0 to 9 feet, and the remaining 5 acres from 9 to 12 feet; at high water springs their areas have respectively from 30 to 39 feet, and from 39 to 42 feet. From this it will be seen that there are not more than 5 acres of available anchorage within the new harbour, with an average depth of only 10 feet water; but it is recommended that an area of 30 acres in extent be dredged to a uniform depth of 9 feet below the lowest tides.

**Lights.**—On the extremity of Cornet castle breakwater (at the south side of the entrance to the outer harbour) is a *fixed* light at an elevation of 46 feet above high water, visible at the distance of 9 miles. From it the Longue Pierre rock off St. Martin point bears S.S.W. distant 2 miles; Les Têtes d'Aval (Lower Heads) rocks buoy S.E. by S.  $2\frac{1}{2}$  miles; Brehonnet rock E. by N.  $\frac{1}{2}$  N.  $2\frac{1}{2}$  miles; Platte rock N.E. by E.  $2\frac{1}{2}$  miles; and the Roustel rock N.E. by E.  $\frac{1}{2}$  E.  $2\frac{1}{2}$  miles.

A *fixed red* light is exhibited from a wooden building on the south pierhead of the old harbour of St. Peter Port, for the convenience of vessels approaching the roadstead or harbour. It is 35 feet above high water, and may be seen by vessels passing through the Little Russel channel from northward, the Great Russel from eastward, and also from southward when St. Martin point is rounded.

**Tides.**—On full and change days it is high water at  $6\frac{1}{2}$ h.; springs range 26 and neaps  $18\frac{1}{2}$  feet. With equinoctial spring tides the water rises 31 feet, but both springs and neaps are depressed or increased by easterly or westerly winds.

**Guernsey Roads.**—The anchorages off St. Peter Port are known as the Great and Little roads.

**Great Road.**—In the Great road (north-eastward and eastward of Cornet castle) vessels are sheltered against all winds, except those from between S.S.W. and S. by E., which send in a heavy sea, and strong north-easterly gales are said to cause some inconvenience. The ground is excellent for holding, and the depth is 8 to 16 fathoms. The stream sets nearly straight through it both ways, the flood running N.E.  $\frac{1}{2}$  N., and the ebb S.W.  $\frac{1}{2}$  S. The dangers in the way when entering from southward are the rocks lying off shore between St. Martin\* point (south-east end of the island) and Cornet castle, those off the latter, and the shoal patches on the Great bank, besides the rocks extending  $1\frac{1}{2}$  miles south-westward from Herm and Jethou.

The Great bank within the 5-fathom line at low-water springs is  $1\frac{1}{2}$  miles long and 2 cables broad. From its southern limit, St. Peter Port church is in line with the Anfré beacon; and from its northern limit, the north angle of Cornet castle, the old harbour lighthouse, and Elizabeth College tower are in one. The shoalest part (17 feet) lies 2 cables southward of this latter line of direction, and from it the above church is just open of the south angle of Cornet castle; the Anfré beacon, and the white stone beacon on the top of Fermain point in line, leads northward of it, and crosses the north end of the bank in 20 feet at low water. Vale mill, open eastward of mount Crevelt tower N.  $\frac{1}{2}$  E., leads eastward of the bank in 24 to 10 fathoms, and to the outer part of the anchorage. Vessels are recommended to moor with the starboard anchor to the W. by S., and the port anchor to the E. by N.

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\* A black ball-beacon has been placed on Longue Pierre, one of the rocks off St. Martin point.

*Little Road.*—The Little road lies northward of Cornet castle, between it and the Sardrette rock, on which is a beacon; it is used chiefly by the traders and small vessels belonging to Guernsey, and affords excellent shelter from all winds; that from the N.E. by E. being considered the worst,—the depth is  $3\frac{1}{2}$  to 6 fathoms, sand, mud, and sea-weed. The tide from half-flood till half-ebb sets E. by N., and from half-ebb to half-flood W. by S.

On the south side of Guernsey vessels may anchor anywhere with the wind along or off the land; but it is recommended to only remain a tide. The north end of Serk should always be kept open southward of St. Martin point.

**GREAT and LITTLE RUSSEL CHANNELS.**—Vessels from northward and north-eastward may reach St. Peter Port either by the Great or the Little Russel channel. The former is between the islands Herm, Jethou, &c., and Serk; it is about 2 miles in breadth and very easy of access even to strangers, yet should not be attempted by them except in emergency, as the tides are extremely rapid, rendering careful navigation very necessary. The stream of tide sets straight through both ways, viz., E. by N.  $\frac{1}{2}$  N. and W. by S.  $\frac{1}{2}$  S., and runs nearly equally in time, that is  $5\frac{1}{2}$  hours each, allowing about half an hour for high and low water slack. The Grune (a 7-fathom rock in the middle of the channel,  $1\frac{1}{2}$  miles W. by N.  $\frac{3}{4}$  N., from the west end of Brecqhou) generally shows its presence by a strong ripple; close to it on all sides the sea is very deep. For anchorage see Herm, Jethou, &c.

The Little Russel (between Guernsey and the north-west side of Herm island) is narrowed to about three cables in width, by the numerous scattered rocks which project from both islands. Through it the flood and ebb streams follow the trend of the channel, N.E.  $\frac{1}{2}$  E. and S.W.  $\frac{1}{2}$  W. (nearly), and run about equal lengths of time, but it must be remembered that, although the stream begins to set through at the same time that it does in the Great Russel (viz., half-flood by the shore), there is no northern inclination round St. Martin point until about 4 hours' flood. Care must, therefore, be taken to prevent being drawn into the Great Russel, or among the rocks at the south-west end of Jethou. A stranger should not attempt the Little Russel channel, unless compelled by circumstances.

**HERM, JETHOU, &c.**—The island of Herm lies  $3\frac{1}{4}$  miles east from St. Peter Port (Guernsey), and, with Jethou, divides the Great and Little Russel channels from each other. These islands, as already observed, are surrounded by a great number of rocks and ledges, some of which are always above water, some alternately covered and uncovered, and others never appear at all. The channels between the islands and rocks are extremely intricate, and rendered dangerous by the rapidity and various flowings of the tides; they are in consequence only frequented by fishing and stone boats. Half a mile south-westward of Herm lie the little islands Jethou and Crevichon, which are connected with each other by a shingle causeway, covered at half-flood.

*Anchorage.*—Between Herm and Jethou there is very good anchorage, where a small vessel may ride secure from all winds except those from between S.W. and East. The best approach is from the Great Russel channel. The dangers in the way in entering are the Fourquies, a patch of sunken rocks three-quarters of a mile S.E.  $\frac{1}{2}$  E. from Jethou; and, further in, the Meulettes on the east and the Tinker on the west side. The mark to clear the Fourquies on the eastern side is Vale castle (Guernsey), touching the south end of Herm, N.W.,  $\frac{1}{2}$  N.: and Vale mill (the most north-eastern mill on Guernsey) touching the east-side of Jethou, N.N.W.  $\frac{1}{2}$  W., will carry considerably westward of them. The Meulettes lie about half a cable from the south point of Herm, and the Tinker about a cable eastward of Jethou. This anchorage is very convenient, for the tide runs nine hours southward, and only

three hours northward; the former stream, commencing when it is low water by the shore, sets directly into the Great Russel during the whole of the flood, and until half ebb, when the latter stream begins and runs faintly to the northward until low water. A vessel, therefore, caught at her anchors by a southerly wind, may always, at half-ebb, run through the Passe Percée (the narrow channel between Herm and the islands Crevichon and Jethou) into the Little Russel, and thence to sea or into Guernsey roads.

**SERK.**—Serk lies eastward of Guernsey, and divides the Great Russel channel from that of La Déroute. It is lofty in all its extent, and is in length, including Little Serk (with which it communicates by a very narrow causeway, known as the Coupée) about  $2\frac{3}{4}$  miles, and in breadth rather more than  $1\frac{1}{3}$  miles where broadest. The little island Brecqhou (or Isle des Marchants) lies on the western side of the island, from which it is separated by a narrow channel 17 to 20 fathoms deep, called by the islanders the Gouliot, through which the tide runs with great velocity. The approach to Serk on the north-eastern, eastern, south-eastern, and south-western sides, is difficult and hazardous, by reason of the numerous rocks that encompass it, as well as by the rapidity and inequality of the tide in its immediate vicinity. These difficulties, however, can be easily overcome by paying proper attention to the leading marks and run of the stream; but as a description of the latter would be more embarrassing than useful to a stranger, we purposely refrain from giving it, and will only add that it is advisable to keep well outside the outermost rocks, by not approaching the northern, western, and southern sides of the island nearer than three-quarters of a mile, and the eastern than to have the Corbière (a rock, 110 feet high, off the south-western point of Jersey) touching the land at Cape Grosnez, bearing S. by W.  $\frac{3}{4}$  W.; the last-mentioned mark clears the Blanchard rock on its east side, at a good offing. The Blanchard (7 feet under water) lies nearly two miles from Serk, and is the easternmost of the dangers in its vicinity.

To go northward of the Blanchard and the rocks between it and Serk, the northern bluff land on Herm should be kept in sight northward of the northern extremity of Serk, about N.W. As Serk is approached it is necessary to steer to the northward, and not approach it nearer than three-quarters of a mile.

**Anchorage.**—There are several places about Serk where small vessels can anchor, but none attainable by strangers, except, perhaps, those off the N.E. and N.W. parts of the island. The former is a very good anchorage, with winds between W. and S.W., and in very fine weather may be tenable even with winds from other quarters; the position recommended is about half a mile E. by S. from the north point of the island, in 12 to 15 fathoms water, fine clean sand. The anchorage at the latter place in what is known as Banquette bay, affords very good shelter against easterly, south-easterly, and southerly winds; it is usual to ride in 5 to 9 fathoms, bottom of coarse sand, small black stones, and sea-weed, with the north point of the island about East, distant three-quarters of a mile. From Banquette bay, if the wind chop round to the W.N.W., there will be little difficulty in weathering the Bec du Nez (a rock off the north extremity of Serk) and getting under the lee of the island; or, vessels may go thence to sea.

**LA DEROUTE.**—La Déroute (the channel between Serk and Jersey) is about ten miles across, but the narrowest part, between the Blanchard rock and the Pierres de Leec, is no more than 8 miles. In about its centre, the streams of ebb and flood set directly both ways, and run for equal spaces of time, but in the neighbourhood of the islands they flow in many directions during the twelve hours, being governed by the configuration of the islands and the irregularity of the bottom. The mark by which to pass eastward of the Blanchard has already been given; the other dangers



in the channel lie near Jersey, and are named as follows:—Desormes, Pierres de Lecq (or Paternosters), Rigdon, West rock, and Great bank. There are also rocks in the immediate vicinity of Jersey.

**Desormes Bank.**—The Banc des Desormes lies  $3\frac{1}{2}$  miles northward of Grosnez point (Jersey), and the same distance from the highest of the Pierres de Lecq. It consists of rocky ground a mile long, N.N.W., and S.S.E., and one-third of a mile broad. The depth over it is 12 to 15 fathoms, excepting near its extremities, where two large conical masses rise from the bottom, the northern one to within 23 feet of the surface, and the southern to  $8\frac{1}{2}$  fathoms at low water; the latter bears from the former S.S.E., distant three-quarters of a mile. On the 23-foot rock, La Moye signal post is only just shut in behind the outer part of the Pinnacle\* S.  $\frac{1}{2}$  W.; and the south-western high rock of the Pierres de Lecq, appears shut in with Belle Hogue point nearly as far as the outer part of its high bluff, S.E.  $\frac{1}{4}$  S. In boisterous weather the sea breaks very heavily over it.

**Pierres de Lecq.**—The Pierres de Lecq, or Paternosters, are a dangerous group of rocks, lying north-eastward of Cape Grosnez, from which their western extremity bears N.E. distant  $2\frac{1}{2}$  miles. They trend about East and West about  $1\frac{1}{2}$  miles. The channel between them and the land is very deep and free from danger, with the exception of a 21-foot rock (the Grune de Becquet) distant rather more than half a mile from the nearest part of Jersey, in the direction of E. by S.  $\frac{1}{4}$  S. from the extremity of Pleinmont point; between this danger and Jersey are two rocks 12 feet under water, known as the Grunes de Douet.

The eastern end of the Pierres de Lecq will be cleared so long as Rozel mill is in sight eastward of Belle Hogue point, or it may be brought in one with that point, bearing S.S.E.  $\frac{1}{4}$  E.; the western extremity should not be approached nearer than when St. Peter's mill is in one with the flagstaff at Greve de Lecq, S.  $\frac{3}{4}$  E.,—but it will be prudent to keep the Corbière in line with the Pinnacle, bearing S. by W.  $\frac{3}{4}$  W.

By keeping nearer to Jersey than the Pierres de Lecq, a vessel will pass southward of the Grune de Lecq (a rock lying S. by E.  $\frac{1}{4}$  E., nearly half a mile from the large central rock of the cluster), which dries 2 feet in height at low tide. The two outermost sunken patches of the Pierres de Lecq (2 and 17 feet under water) are distant  $5\frac{1}{2}$  cables S.W. by W. from the large rock.

Vessels may run between the Pierres de Lecq and Jersey by keeping Rozel tower shut in behind Belle Hogue point S.E.,† until the white tower in Greve de Lecq (a white sandy bay) comes in line with the eastern point of the bay S.W.  $\frac{1}{2}$  W., when steer north-eastward until Rozel mill appears over Belle Hogue point S.S.E.  $\frac{1}{4}$  E., which clears the rocks on their north-east side.

The tide, both ebb and flood, sets strongly over the Pierres de Lecq.

**Rigdon Bank.**—The Rigdon Bank, two miles W. by S. from Cape Grosnez, consists of coarse sand and shingle, interspersed with rocks upon the shoalest of which is a depth of only 11 feet at low tide. Between it and the great ledge of rocks projecting from L'Etac point, there is a channel about half a mile wide and 4 to 8 fathoms deep. Pleinmont point in one with Cape Grosnez E. by S., leads northward of this dangerous shoal; and on its western side it should not be approached nearer than when La Moye signal-post is seen midway between Flat and Sharp rocks, S. by E.  $\frac{3}{4}$  E.

**West Rock.**—The West Rock, known to some of the Jersey fishermen as Gray bank, lies  $1\frac{1}{2}$  miles outside, or westward of Rigdon Bank; it consists of a mass of

\* The Pinnacle is a remarkable rock 200 feet high, at the north-west end of Jersey. It is on the extreme edge of the coast, about one-third of a mile S.W. from the ruins of the castle on Grosnez point.

† This bearing appears by the chart to lead very close to the south-western shallow patch (2 feet) of the Pierres de Lecq.

rock, very steep on the outside,  $1\frac{1}{2}$  cables long N.E. and S.W., by a cable broad, on which the general depth is 8 to 10 fathoms, excepting at its apex, near the middle, on which there is only 6 fathoms at low water. On this spot St. Peter's church-spire appears a little open northward of a small square fort on the beach in St. Ouen bay, and a little open southward of No. 2 tower, S.E. by E.  $\frac{1}{4}$  E.; the highest of the Pierres de Lecq is open  $8^{\circ}$  of Grosnez bluff, and the same bluff and the Corbière rock subtend an angle of  $72^{\circ}$ . The shoal part is well marked by a strong ripple near low water.

The channel between West rock and Rigdon bank is more than a mile wide, quite clear, and 12 to 15 fathoms deep.

**Great Bank.**—The Great bank is the last of the outlying dangers in the Déroute channel, near the west coast of Jersey. It is only dangerous to open boats, as, with the exception of Green rock (a patch of 11 feet at the south-east end of the bank), the depth is not less than 5 fathoms over any part of it, the bottom being coarse sand, gravel, and shells. Its south-east end is  $1\frac{1}{2}$  miles N.W. by W.  $\frac{3}{4}$  W. from Corbière point, whence it extends to the N.W. by N., a distance of  $3\frac{3}{4}$  miles, and is about half a mile in breadth.

Vessels taking the Déroute channel can keep outside all the foregoing rocks and shoals by preserving an offing from Jersey of about  $4\frac{1}{2}$  miles, until westward of Corbière point (the south-west point of the island), when, if bound to St. Aubin bay, the coast can be approached to about  $2\frac{1}{2}$  miles, and if a pilot has not already been obtained, one should be taken on board to assist them to their anchorage, for the entrance to the bay is encumbered with rocks.

## JERSEY.

Jersey is in shape nearly a parallelogram, its greatest length being  $9\frac{1}{4}$  miles E.S.E. and W.N.W., and its breadth  $5\frac{3}{4}$  miles. Its surface in the interior, in an E.S.E. and W.N.W. direction, is almost everywhere level, and elevated about 280 feet above mean tide; its northern shore is 100 to 150 feet higher. Unlike Guernsey, the declivity of which lies towards the north-west, Jersey declines towards the south-east; and to this circumstance may probably be attributed the pre-eminence which the latter enjoys in the richness of its productions, the luxuriant appearance of its surface, and the peculiar mildness of its climate.

It is well wooded, fertile, and intersected by deep beautiful valleys running from south to north, through which numerous streams find their way to the low land on the south coast,—several occasionally uniting before discharging themselves into the sea.

Jersey possesses several good bays or roadsteads besides its artificial harbours. The best among the former is Gorey roads (at Grouville bay, on the east side of the island) and St. Aubin bay on its south coast; in either of which a good and well-found ship may ride out the heaviest gales in safety. The principal artificial harbour is at St. Helier (the chief town of the island on the east side of St. Aubin bay); there are also harbours of inferior magnitude at St. Aubin (on the north side of the bay), at Gorey and Rozel, but these are dry at low water spring tides.\*

\* Our description of Jersey is only of a general character, touching upon the principal bays and outlying rocks. No shipmaster bound to it should be without the excellent Admiralty charts (Nos. 62 A, B, C,) and the "Channel Islands Pilot," by Staff-Commander JOHN RICHARDS, R.N. from which we have extracted largely.

Jersey is in telegraphic communication with England and France. The cable connecting it

From St. Martin point (Guernsey) Grosnez, the north-west point of Jersey bears S.S.E.  $\frac{1}{3}$  E. distant 15 miles, and from cape La Hague S.W. (southerly) 31 miles. The rock La Corbière, off its south-west point, bears N.N.E.  $\frac{1}{3}$  E. from cape Frehel, distant  $29\frac{1}{2}$  miles and its south-east point, La Roque, is distant  $29\frac{1}{2}$  miles N.N.E.  $\frac{1}{4}$  E. from Cezembre islet, off St. Malo. On account of the numerous rocks surrounding the island, and the off-lying sunken reefs, the assistance of a pilot is almost indispensable to strangers bound to its harbours or navigating in its immediate vicinity. In addition to these very formidable dangers, the tides run with great rapidity, and are much influenced in direction by the form of the reefs they impinge upon; the rise and fall is also considerable,—about 30 feet at springs, and 23 feet at neaps.

**ST. OUEN BAY.**—St. Ouen bay on the western side of the island, between cape Grosnez and Corbière point, affords excellent shelter against easterly and south-easterly winds in 8 to 15 fathoms water, but in consequence of its exposure to westerly winds is only resorted to for the purpose of stopping a tide. The only outlying hidden danger in entering this bay from northward is the Rigdon bank, which, with West and Great banks, has been already described on page 175. To pass between the Rigdon bank and the rocks off L'Etac point (which is not safe for a large ship at low water) keep the highest of the Pierres de Lecq just open of Grosnez point, bearing E.N.E.

The marks for the best anchorage in the bay are, the steeple of St. Peter E. by S.  $\frac{3}{4}$  S. and Grosnez point N.E.  $\frac{1}{2}$  N. The depth is 10 to 15 fathoms, bottom of coarse sand and small shells.

**La Corbière.**—Corbière point, the south-west extremity of Jersey and the south point of St. Ouen bay, is a small low bluff with a flagstaff on the summit, and two small houses at its side. Just within the point the land rises at a steep slope, and soon unites with the high tableland of La Moye. At a quarter of a mile westward of the point, and connected with it by a reef of rocks which dries after last quarter ebb, is the remarkable rock known as La Corbière, which rises 70 feet above high water, and is visible at the distance of 10 or 12 miles; it stands prominently out from the coast line of the island, and forms the principal landmark for vessels approaching from westward.

The principal dangers off Corbière point are Green rock, Les Boiteaux, and Noirmontaine.

**Green Rock.**—Green rock (the outermost danger) lies N.W. by W. nearly three-quarters of a mile from the Corbière, and two cables from the Boiteaux, on the same line of bearing. The marks for it are St. Ouen mill just within or eastward of No. 3 martello tower in St. Ouen bay (counting from northward) bearing N.E. by E.  $\frac{1}{2}$  E., and the whitewashed rock within the Corbière (the Jument) in line with La Moye point, S.E.  $\frac{3}{4}$  E. It is 11 feet under the surface at low water.

A rock with only 8 feet water on it, lies N.N.E., distant a cable from Green rock.

Green rock and all rocks immediately within it will be cleared on the north-west

with France lies in a S.E. by E.  $\frac{1}{4}$  E. direction between Fliquet bay (Jersey) and Pirou (France). The shore end or landing in Jersey is marked by a white martello tower, on which is painted in black letters the word *Telegraph*, surmounted by a green disc. On the French coast (at Pirou) the shore end is distinguished by a white tower, 25 feet high, erected on the sand hills, on which is painted in black letters the word *Telegraph*, surmounted by a green disc.

To prevent damage to the cable by the anchors, grapnels, oyster dredges, &c., used by fishermen, the following directions are given:—

“The course of the cable is distinctly indicated by the towers which, during the day, are a sufficient guide for clearing it. Vessels (such as fishing smacks) without a compass can avoid it on the south side by keeping Coupe point in one with Rozel Tower, and on the north by keeping the Guard-house in Bouley bay in one with Rozel tower.”



side by keeping St. Ouen windmill open northward of the martello tower No. 3; and on the southward side by keeping La Moye signal-post open southward of Jument rock. La Moye signal-post in line with Jument rock leads 3 cables southward of Green rock, and half a cable clear (on the same side) of the Noirmontaise reef.

**Boiteaux.**—The Boiteaux (two rocks only 30 fathoms apart, lying within Green rock) dry 9 feet in height at low water; they are distant nearly half a mile from the Corbière in a N.W. by W.  $\frac{1}{2}$  W. direction. From the southern Boiteaux St. Ouen church is seen touching the southern side of the 4th martello tower, N.E. by E.  $\frac{1}{2}$  E.; and La Moye signal-post is in line with the north side of the peak of the Corbière rock, S.E. by E.  $\frac{1}{2}$  E.

**Noirmontaise Reef.**—The Noirmontaise reef, a quarter of a mile westward of the Corbière, is 4 feet above the surface at low water.

A reef, 4 feet under the surface at low tide, also lies a cable westward of the Corbière; there is also a large rock, one cable S. by E. from the Corbière, which uncovers after first quarter ebb. All these dangers may be cleared on the south side by the mark that clears the Boiteaux rocks.

Between Green rock and the Boiteaux there is a narrow deep-water channel; there is also a channel (within the Noirmontaise and Boue rocks) close to the Corbière, leading to La Frouquie pass,—but the space included between the Boiteaux and the Boue, and from the latter rock to within a cable of the Corbière, is so thickly studded with sunken rocks as to be very dangerous, even for boats, at low water.

**Jument Rock.**—The Jument rock (remarkable from having a large white patch painted on it) lies about a third of a mile within the Corbière to the south-eastward, and an eighth of a mile from the high bluff next to the eastward of Corbière point; with which bluff it is connected by a reef dry at low water. Outside it about half a cable there is a dangerous rock which dries only at last quarter ebb; it should not be approached therefore nearer than a quarter of a mile.

**La Moye Point,** a high cliffy bluff, a mile eastward of the Corbière, is safe of approach from westward, to a reasonable distance from the shore; but at  $1\frac{1}{4}$  cables off it there is a sunken rock, having only 6 feet over it at low water; and close to the eastward of this rock, and probably connected with it, lie the Kaines, a dangerous rocky group, the highest of which only covers at last quarter flood. The outer sunken rock of the Kaines lies 2 cables from the shore.

All these dangers will be cleared by keeping the Corbière open a little westward of the Jument, until Tabor chapel (a remarkable white building, with a slate roof, on the high land near the middle of and overlooking St. Brelade bay) opens out a little eastward of Grosse Tête.

**ST. BRELADE BAY.**—St. Brelade bay (near the south-west end of the island, between La Moye and Le Fret points) is much contracted by an extensive reef that fringes its eastern shore, and the anchorage in it is further cut up by the Fournier and Fourché rocks. It is therefore very inferior to St. Aubin bay, and more exposed to the sea in southerly gales; nevertheless, small vessels and even large open boats anchored off port Bouilly, have been known to ride out fresh gales from this (the most exposed) quarter in safety. Under all circumstances of wind and weather there is much less sea on the western than on the eastern side of the bay.

On approaching the bay from westward the most remarkable objects seen are the high square rock (Grosse Tête) under the high cliffy land of La Moye on the west side of the bay; and Noirmont tower, at the end of the low point of that name

nearly a mile eastward of the bay. On opening out the eastern side of the bay clear of Grosse Tête, the white sandy beach appears, and the two martello towers built to defend it; beyond are villa residences and scattered groups of houses; and overtopping all (on the high land near the middle of the bay) stands Tabor chapel, the principal landmark in it.

As it is unnecessary to describe the sunken and other dangers in the bay (for no vessel should attempt to enter it without having at hand the large Admiralty chart No. 62 B, in which they are fully shown), we proceed to give directions for entering it.

Vessels bound to St. Brelade bay from north-westward, on approaching the shore of Jersey, should keep Plémont point open of Grosnez point, until Corbière rock bears S. by E., or St. Ouen church and mill are in line S.E. by E., to clear Rigdon shoal. With these marks they will be abreast the shoal, and thence should steer so as to round the Corbière at the distance of about a mile; or keep St. Ouen windmill open northward of the No. 3 martello tower in St. Ouen bay, E.N.E., until La Moye signal-post is seen over the top of the Corbière, to avoid Green rock.\* When La Moye signal-post opens southward of Jument rock (60 feet high and white) bearing E. by S.  $\frac{3}{4}$  S., or the outer part of the high table-land within Noirmont point is seen a little open of Le Fret point, a vessel will be clear of the Noirmontaise reef and all other dangers south-westward of the Corbière, and may run for La Moye point until La Motte islet is just shut in behind Noirmont point, and Noirmont tower bears S.E. by E.  $\frac{1}{4}$  E., which is the leading mark for the fairway between the Kaines and the Banc de St. Brelade. If intending to anchor in the bay, when Tabor chapel comes in line with or a little open of Battery point N.E. by E., take it as a leading mark through the western pass into the inner anchorage off St. Brelade. If desirous of approaching the inner anchorage through the eastern pass, open Tabor chapel a little to the eastward of a remarkable black shed on the beach in St. Brelade bay N.E.  $\frac{1}{2}$  N., and run in on that line. Anchor within the Fournier rock, on the above given leading lines and between them, when La Moye bluff comes nearly in line (or a little open) of the outer part of Grosse Tête, about W. by N.  $\frac{3}{4}$  N., in 5 fathoms fine sand. Large vessels not wishing to anchor within the Fournier, may lie in 8  $\frac{1}{2}$  fathoms gravel with the western pass leading mark on, and the Jument rock just shut in with La Moye point. The ground in the bay is tenacious and holds well.

**ST. AUBIN BAY.**—St. Aubin bay is about 1  $\frac{1}{2}$  miles eastward of that of St. Brelade, and it much exceeds it in extent. Throughout it there is excellent anchorage in 3 to 5 fathoms at low water, over muddy sand, with long grass and sea-weed. The whole of the anchorage, though surrounded by rocks, is free from anything that would damage a vessel's cable, and is sheltered from all winds, except those from S.S.E., southerly, to W.N.W., and partially even from these. South-westerly gales between half-flood and high water send in a heavy rolling sea, but in proportion as the water falls, the sea subsides, the rocks in the offing greatly contributing to break its force and effect.

In front of the bay, and off the coast between it and St. Brelade bay, are many sunken rocks, which render its approach by no means easy. As a minute description of these is unnecessary, and it would be impossible to impart an accurate knowledge of them by any written description, we refer the reader to the Admiralty chart (No. 62A), in which they are fully shown.

The rocks just mentioned, and the coast, form nine passages into the bay, viz.,

\* A rock 11 feet under water, already mentioned as lying 6  $\frac{1}{2}$  cables N.W. by W. from Corbière rock.

the North-west, Western, South-west, Silette, Danger rock, Middle, South, and Eastern. In westerly gales, the best time to pass through any of them is between first quarter flood and high water. The first of the ebb throws up a very dangerous overfall off Noirmont point, and when the westerly tide has fairly made, overfalls extend across all the channels, which continue with more or less intensity according to the height of the ocean swell and strength of the wind until the ebb tide slacks.

*North-west Passage.*—The North-west passage, although only  $1\frac{3}{4}$  cables wide at the narrowest part (between point Le Fret and the rocky bank of that name off it), is perfectly safe for the largest vessels, and is not less than 7 fathoms deep at low water in any part of it. It is indeed more frequently used than the other channels, being the steam-packet route between Southampton, Guernsey, and St. Helier.

Having rounded the Corbière, as instructed in the directions for St. Brelade bay, and passed between La Moye point and the Banc de St. Brelade, by shutting in La Motte with Noirmont point, and having Noirmont tower on the line of bearing S.E. by E.  $\frac{1}{4}$  E., run direct for the tower until the peak of Corbière rock is seen touching La Moye point, bearing N.W.  $\frac{1}{4}$  W.;—with this mark the vessel will pass through the middle of the narrowest part of the channel off Le Fret point, in 8 fathoms at low water. Continue on the same line until the white patch on the sea-wall at Greve d'Azette comes on with Dogs Nest rock (it has a white patch on it surmounted by a small iron beacon), bearing E. by S.  $\frac{1}{4}$  S.; this mark leads through near the middle of the channel between Noirmont point and the Fours, some rocky patches 4 to  $4\frac{1}{2}$  cables southward from the point; it also leads a safe distance (nearly  $1\frac{1}{4}$  cables), inside the Rouaudière rock, and exactly midway between Les Cloches and the rock 7 feet under water lying a cable outside the Oyster rock beacon.

After passing Oyster rock beacon, St. Mark Church (spire) will soon come in line with the white patch at the south end of Albert pier (which is the mark to enter the Little road with); but after passing inside the Platte rock bring the church spire in line with the northern white patch on Albert pier, to clear the Crapaud Mangeur rocks.

*Western Passage.*—The Western Passage is between the Hubaut reefs and the Banc de St. Brelade. It is rather more than a quarter of a mile across at its most contracted part, which is between the Petite Grune and La Fret bank; and there is here 9 fathoms water in it. It is the most direct route to St. Aubin bay and St. Helier harbour from westward, one leading mark only being required (the white patch on the sea wall at Greve d'Azette in line with the white patch and iron beacon on the Dogs Nest rock), but as these marks are not easily made out in misty weather, and might then be mistaken, the North-west passage is probably the best for a stranger to take.

The line of the white patch on the sea wall at Greve d'Azette and the Dogs Nest rock bearing E. by S.  $\frac{1}{4}$  S., passes very little more than half a cable northward of the Petite Grune, and almost touches the north side of a rock 14 feet under the surface at low water, lying half a mile outside or westward of the Petite Grune; therefore in entering the channel from westward, keep the Corbière rock well open outside Jument (white), until the white patch in the sea wall at Greve d'Azette is seen clearly open northward of Dogs Nest rock. Run in on this mark (keeping them open), until Tabor chapel comes in line with Le Fret point to clear the Petite Grune, after which they may be brought in line and used as the leading mark to the entrance of the Little road, as instructed in the directions for the North-west passage.



Should the white patch at Greve d'Azette be obscured, De Pas tower in line with Noirmont tower will serve equally well, provided the Hermitage rock is opened out clear of Noirmont point before shutting in Tabor chapel with Le Fret point, to clear the rock (20 feet under water) 2 cables eastward of Le Fret bank; and if all objects to the eastward and near the town are invisible, and the land about Noirmont and La Moye be tolerably clear (which is often the case in very fine weather), Noirmont point may be approached to the distance of a cable; but in passing eastward of it do not shut in La Moye signal-post with Le Fret point until St. Aubin castle is seen open, clear of the land of Noirmont, to clear a dangerous rock lying between and without the line of Noirmont tower and Pignonet beacon. After passing Pignonet beacon bring Noirmont tower a little open to the north-eastward or inside of it, and when about a quarter of a mile eastward of the beacon anchor until the weather clears.

*South-west Passage.*—The South-west passage is between the Banc les Vrachère and the Grunes Vaudin; eastward of the Grande Grune and westward of the Grande Four. The narrowest part of the channel is between the rock (6 feet under water) at the north-west side of the Grande Four, and another sunken rock of 20 feet water, which bear from each other W.N.W. and E.S.E., distant 2 cables.

Captain Saumarez's house (known as the Firs, coloured yellow, and standing about half-way up the slope of the hill a little eastward of St. Matthew church) in line with Noirmont tower bearing N.E.  $\frac{1}{2}$  E., leads midway between the Frouquie and the westernmost of the Grunes Vaudin: enter the channel therefore on this line and run on it until the white patch in the sea wall at Greve d'Azette comes in line with the white patch on the Dogs Nest rock E. by S.  $\frac{1}{4}$  S., with which as a leading mark proceed eastward as before.

As the leading mark through this channel leads dangerously close to the west side of the Grande Four, it is recommended (when the flood tide is running) to run in on it only so far as to bring Tabor chapel open and shut over the upper part of the slope of Le Fret bluff, and to run on this line until the eastern leading mark comes on as before.

Tabor chapel (on the high land overlooking St. Brelade bay) is here given as the most conspicuous mark for a stranger to recognise, but this leading line approaches the Grande Grune rather nearer than is desirable: for the *middle* of the channel Tabor chapel should be shut in altogether, and the Pic-nic hotel westward of it (a building with a white gable on the low land in St. Brelade bay), brought in line with the extremity of point Le Fret.

As there are overfalls and strong eddies from the rocks in this channel on both ebb and flood, it should never be taken from choice except in very fine weather.

*Sillette Passage.*—The Sillette passage is between the Sillette rocks and the Grunes aux Dards (which is the narrowest part of it, the channel here being 2 cables wide). It has an average depth of 6 fathoms; but in the middle of the fairway there is a spot of only 26 feet water at low tide,—hence a not greater depth than this can be counted on.

This passage should never be attempted in a sailing vessel without a fair commanding wind, as the tidal stream (both ebb and flood) sets right across it. The leading mark is the western martello tower (white No. 3) in St. Aubin bay in line with the east side of Grosse rock (on which there is a beacon) bearing N.N.E.;—this leads barely  $1\frac{1}{2}$  cables eastward of the sunken rocks, the Poches à Suie, at the entrance to the channel, on which is a depth of only 4 feet at low water; midway between the Sillette (on one of the eastern rocks of which there is a pole beacon) and Grunes aux

Dards (nearly  $1\frac{1}{4}$  cables eastward of the Petit Four);  $1\frac{1}{2}$  cables eastward of the Pignonet (on which there is a pole beacon); half a cable westward or (inside) the Grunes du Port; and very close inside the western head of Junée.

*Middle Passage.*—The Middle passage is between the Grunes aux Dards and Danger rock (on the west side),—and Les Têtards, the Hingutte reef, and the Grunes St. Michel (on the east side). The apparent narrowest part of the passage is more than half a mile across, this being the distance between Danger rock and the Grunes St. Michel; but there are two rocks 14 and 15 feet under water at low tide, lying outside (or southward) of the Grune St. Michel, distant from it nearly half a mile,—hence the channel is divided into two parts. The westernmost rock of the two, 15 feet water, is nearly in the middle of the channel at its entrance, and bears from Danger rock E.S.E. nearly half a mile. The best part of the Middle passage lies between Danger rock and this 15-foot rock; the ground here is clean and the soundings regular in 7 fathoms. The eastern side of the Middle passage is rocky, and the depth irregular.

Mont Plaisir house touching the western side of St. Aubin castle tower, bearing North, is the leading mark through the Middle passage; it leads nearly  $1\frac{1}{2}$  cables westward of the 15-foot rock; a quarter of a mile east of Danger rock, and rather less from the Frouque of the Grunes aux Dards (on which the depth is 5 feet at low water); nearly 2 cables westward of the Rouaudière;  $1\frac{1}{2}$  cables eastward of the Grunes du Port; and outside but very close to Les Junée (sunken rocks).

If bound to the anchorage in St. Aubin bay, haul to the eastward when the east end of Almorah terrace comes in line with La Vrachère (the innermost high rock northward of Elizabeth castle) to clear the Diamond rock (8 feet under water), and anchor when La Haule house is seen on the east side of St. Aubin castle tower.

*Danger Rock Passage.*—This passage is between the Grunes aux Dards and Danger rock, and at this part is a third of a mile wide, and  $5\frac{1}{2}$  fathoms deep near the middle, but there are sunken rocks close to the southward of this middle part, one of which is 16 feet under water. This passage, like the Sillette, is dangerous at times for sailing vessels, and should never be taken without a pilot. To steamers, however, whose captains are acquainted with the pilotage, it has attractions, as being the only direct passage to the Little Road of St. Helier from south-westward.

St. Mark church (spire) in line with South-east rock (off the Hermitage) bearing N.E. by E.  $\frac{1}{4}$  E., leads through the channel nearly  $1\frac{1}{2}$  cables southward (or outside) of the southernmost rock (awash at low water) of the Grunes aux Dards, and rather a greater distance *inside* Danger rock: thence it also leads rather more than  $1\frac{1}{2}$  cables southward of the Rouaudière rock, and close to the east side of a rock (8 feet under water) off the Oyster rocks. Between this 8-foot rock and the Bieuse rock (marked by a beacon pole), and as far eastward as the Oyster rocks, the ground is quite clear of rocks.

*Hingutte Passage.*—This channel, between the Hingutte reef and Les Têtards, is nearly half a mile wide, and 7 to 8 fathoms deep. It is a good and safe passage at slack water, but requires care in making proper allowance for the tide, which sets right across it.

St. Mark church (spire) in line with the beacon on Dogs Nest rock, bearing N.E.  $\frac{1}{4}$  N., leads through the channel, between the Hingutte reef and Les Têtards. After passing inside the Hingutte reef, St. Matthew church will soon come in line with the Gros du Chateau rock N.  $\frac{1}{4}$  E., with which mark on run between the Cloches rocks to the entrance of the Little road of St. Helier.

*South Passage.*—The South channel is between Les Têtards (on which the depth is only 2 feet at low water) and a sunken reef a little more than 2 cables eastward of them, the shoalest spot on which is 14 feet at low water. Although it is 8 fathoms deep, it is not so safe as the Hingutte passage or as the Eastern passage.

St. Matthew church (tower), a dull white-coloured building, in line with Gros du Chateau rock N.  $\frac{1}{4}$  E., leads through in about mid-channel, and between the Cloches rocks up to the entrance of St. Helier Little road. If bound to the anchorage in St. Aubin bay follow this line of direction until St. Peter church (spire) comes in line with the lower Blanc Pignon house, N. by W.  $\frac{1}{4}$  W., when steer with that mark on to the anchorage.

When near low water St. Peter church spire may be lost sight of before arriving at the anchorage in St. Aubin bay, in which event care must be taken to refer the line of its direction to some other object.

*Eastera Passage.*—The narrowest part of this passage is between Demie de Pas (on which there is a beacon pole) and a rock 11 feet under water at low tide. The latter rock lies W.N.W. nearly a third of a mile from Demie de Pas, and from it a rock 9 feet under the surface bears N.  $\frac{1}{2}$  W., distant nearly a cable. The ground outside Demie de Pas is clean up to its edge, which is not more than 40 yards from the beacon.

The new mill on the beach at Millbrook, just in sight or open and shut of the high rocks on the west side of the Hermitage, bearing N.  $\frac{1}{4}$  W., leads  $1\frac{3}{4}$  cables westward of the Demie de Pas, and barely a cable eastward of the sunken rocks just mentioned. A vessel may therefore enter the channel on this line, and run on it until Nicolle tower comes in line with Tas de Pois rock (white), after which, St. Matthew church must be brought in line with Gros du Chateau rock (as for the South channel), to run up to the entrance of the Little road; or St. Peter church spire in line with lower Blanc Pignon house to approach the anchorage in St. Aubin bay.

*Little Road.*—The Little roadstead (eastward of the Hermitage rocks), is frequented only by vessels intending to enter the harbour of St. Helier at tide time, or during the neaps, in fine weather, with off-shore winds. The depth in it is 16 to 6 feet at low water springs, but the anchorage is so much contracted by rocks that vessels over 8 feet draught are compelled to moor. At low-water springs it is completely sheltered on the east side by a rocky barrier entirely dry, extending from point De Pas to the Dogs Nest rock; on the west side there is also a chain of sunken rocks, extending from the Hermitage to the Oyster rocks and beyond to the distance of 600 feet outside the be—thacone narrow gaps of deep water through this rocky barrier are too tortuous to be available as ship channels, therefore no vessel of greater draught than 5 feet should attempt to pass this barrier at low water.

When bound from St. Aubin bay into the Little road it is best to weigh and proceed about half flood; at which period the depth between the pier-heads of Victoria harbour will be 16 feet, and between the pier-heads of the inner harbour 8 feet;—at the highest springs the depth at the entrance of Victoria harbour is 36 feet, and between the pier-heads of the inner harbour, 27 feet.

*Bound from the anchorage in St. Aubin bay into the Little road, by the channel inside (or northward), of the Oyster Rocks,* steer towards the middle of the passage between the Oyster rocks and the Hermitage—being careful not to open Almorah terrace eastward of the latter until the iron pole beacon on the Grande Mangeuse rock is in line with the outer or southern high chimney of the Engineers' barrack (a long brick building on Point de Pas adjoining the north side of the tower) bearing E.  $\frac{1}{4}$  S.; with this mark on a vessel may run through a gap in the barrier reef, in not less than 8 feet at low water. When South-east rock (lying off the east side of Hermitage) is shut in with Elizabeth castle she will be within the limits of the anchorage in the Little road, and may anchor as convenient, or proceed into the harbour; if the latter, St. Mark church-spire in line with the northernmost white patch on the Albert breakwater is the leading mark to the entrance.



The width of this gap in the barrier reef is only 60 yards; it is bounded on the north side by a small rock that dries 1 foot at low water, and on the south by a rock 2 feet under water at that period.

*Outside the Oyster Rocks from Westward.*—The channel between the westernmost of the Cloches (which rock is 8 feet under the surface at low water) and the outer sunken rock off the Oyster (which has 7 feet water over it at the same period) is  $1\frac{1}{2}$  cables wide and 5 fathoms deep at the lowest spring tides. The white patch on the sea wall at Grève d'Azette and the beacon on Dogs Nest rock in line leads through the middle of it; run on this line therefore until St. Mark church-spire comes in one with the white patch at the end of Albert pier N.E. by E., with which mark enter the Little road; but after arriving inside the Platte rock, edge away to the northward until St. Mark church-spire is in line with the northernmost white patch on the same pier; which, as already stated, will lead to the anchorage in the Little road, or up to the entrance of the harbour.

*From Southward.*—Pass between the two Cloches rocks with St. Mark church-spire in line with Victoria pier lighthouse N.E. by E.; when inside the Oyster rocks St. Mark church-spire should be brought in line with the white patch at the end of Albert pier; and after passing the Platte, St. Mark church-spire should be brought in line with the northern white patch on Albert pier, as before.

*From St. Aubin Bay over the Bridge to the Little road or St. Helier harbour.*—Steer so as to pass half a cable northward of the Vrachère rock (having a small beacon pole on it), or bring St. Mark's church-spire on with the north side of the hospital, and run with this mark on until De Pas tower opens a little to the northward of the northernmost white patch on the Albert pier, with which run over the Bridge (this part is one foot under water at half tide) and enter the harbour, or haul out into the Little road.

*Making St. Helier at night.*—Bring the Victoria pier light (*white*) to bear N.E. by E.  $\frac{1}{2}$  E. and steer for it. When the pier road light (*red*) is seen, keep it a little open northward of Victoria pier light and pass between Grunes aux Dards and Grunes St. Michel,—the course will be about a cable southward of the Rouaudière rock; within which steer south-eastward to bring the two green lights on Albert pier in line, N.E. The last-mentioned mark leads up to the anchorage in the Little road and to the entrance of the harbour.\*

In entering the harbour allowance must be made for the tide, which at or near springs runs in and out of it with considerable strength. The most dangerous time for vessels entering is about half flood, at which period they are frequently forced over against the sandbank fronting the south pier of the inner harbour before they have time to turn their heads up the harbour.

*General Remarks upon making St. Helier.*—Small vessels when working up towards the narrows of the western channels, may (when eastward of the Kaines) stand into St. Brelade bay until Jument rock (*white*) is open and shut of La Moye point; and to the southward, until Elizabeth castle is seen (just seen) in line with

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\* For a steamer of light draught in charge of an experienced pilot, the two green lights on Albert pier in line, bearing N.E., is by far the best mark by which to run in for St. Helier during night; the weather should, however, be sufficiently clear for distant objects to be visible, and the tide rising. Approaching from north-westward, when within  $2\frac{1}{2}$  or 2 miles of the Corbière rock endeavour to *make good* a S.S.W. course, until the rock bears East, after which steer direct for Noirmont point, which should be approached to within a quarter of a mile; from this position steer out a little to insure clearing the Pignonet rock, then E. by S. for the entrance of the small road. When the two green lights on Albert pier come in one, steer on that line to the entrance of the harbour.

Noirmont point E.  $\frac{1}{2}$  S. When in the narrows of the Western channel, backing and filling is recommended (with a beating wind): if with the flood, with the vessel's head off shore, and if with the ebb, with her head in shore; unless one half the flood at least has run, for at this period (half tide) there are 13 feet water over all the rocks in the offing of St. Aubin bay, with the exception of the Pignonet, Hinguette, and Sillette, on which the depth will be only 9, 8, and 7 feet respectively.

If bound into the Little road or St. Helier harbour, in order to avoid the Rouaudière, it may be useful to remember that St. Mark church-spire touching the south side of Close rock leads 60 yards northward of it; and the same spire in line with the False Hermitage leads southward of it.

A vessel from north-westward running for shelter in St. Aubin bay during a gale from that quarter, should keep at the distance of  $1\frac{1}{2}$  miles from the Corbière to avoid the breaking sea near it (this is especially necessary from half ebb till low water), and when the land of Noirmont is well open steer for its point, until Grosnez point comes in line with the Corbière, after which haul up for La Moye, and bring the marks on for the North-west channel, where much less sea will be found than in the others.

In heavy westerly gales the whole space included between the outlying rocks of Noirmont point is a confused mass of foaming breakers; clouds of driving spray create an impenetrable mist that obscures all marks near the horizon, and beacons marking the rocks are all out of sight under water; but even under such circumstances the North-west passage could be safely taken by a person well acquainted with it, as both Le Fret and Noirmont points are safe of approach for large vessels to the distance of a cable.

On arriving abreast of Noirmont point attend to the directions given at page 179, or do not shut in La Moye signal-post with Le Fret point until the white tower in St. Aubin bay is seen open eastward of St. Aubin castle to clear the Pignonet rocks (the first of the flood sets right on these rocks into St. Aubin bay.) It may be useful to remember that when La Haule house comes on with the inside part of the wall extending westward of St. Aubin castle the vessel will be midway between the Grunes du Port and the Diamond rock; and that St. Saviour church-tower just open northward of St. Mark church-spire and in line with La Vrachère rock will lead up to the anchorage in St. Aubin bay, well clear of the Diamond rock.

**ST. HELIER.**—St. Helier, as already mentioned, is the principal town in Jersey. It is protected by fort Regent (on the heights overhanging the harbour) and by Elizabeth castle (on the rocks westward of the harbour); there is also a fort on the rocks opposite St. Aubin,  $1\frac{1}{2}$  miles from Elizabeth castle in a N.W. direction,—both these fortresses are insulated at high tide. All kinds of supplies required by vessels can be readily obtained here.

The port consists of an outer and an inner harbour, both of which are alike in form, the outer being a repetition of the inner (which it encloses) on an extended scale. In shape they are nearly rectangular; they are narrow in proportion to their length, and their entrances are near their south-western corners.

The inner harbour, which is about 1900 feet long by 300 feet broad, has a depth of 8 feet at its entrance at half tide, and 5 feet within it. The outer harbour is 2600 feet long by 500 feet broad; the depth at its entrance at half-tide is 16 feet, and at 300 feet within the pier-heads 13 feet, on fine sand and mud.

There is a floating dock capable of accommodating vessels of 500 tons; also a steam tug.

The outer harbour is reported to be inconvenient in stormy weather, as its entrance is open to the south-westerly swell, which frequently sets in with strength.

**Lights.**—The lights (all *fixed*) are as follows:—

A *white* light at 31 feet above the sea, visible 6 miles, on the head of Victoria pier; the southern pier, that most to seaward.

A *red* light on the head of Albert pier, at 15 feet above the sea, visible 3 miles. The channel into the harbour is between this light and the white light.

A *green* light on the western angle of Albert pier, at 23 feet above the sea, visible 3 miles.

A *green* light on the parapet of the Esplanade, at 38 feet above the sea, visible 3 miles.

A *red* light at the eastern side of the inner harbour, at one-third of a mile E.N.E. from the white light on Victoria pier-head. This light is also visible about 3 miles.

The inner green light is not shown eastward of the bearing from it of S.W.  $\frac{1}{4}$  S. The green lights in one lead into the roadstead between the rocks which encumber the approach to St. Helier, but over a rock 7 feet under water at low tide. The anchorage (10 feet deep at low water) is a quarter of a mile S.W. by W.  $\frac{1}{2}$  W. from the pier-heads.

**Tides.**—It is high water (full and change) at 6h. 29m.; equinoctial spring tides rise 42 feet, but they are influenced by the wind and other causes. The mean rise of springs is  $31\frac{1}{2}$  feet, and of neaps 23 feet.

**ST. AUBIN.**—St. Aubin is  $2\frac{1}{2}$  miles westward from St. Helier. The harbour, formed by stone piers, is dry at low water: and the bottom consists of soft, muddy sand, upon which vessels lie aground. Opposite the harbour is St. Aubin castle, on the rocks off the shore, from the northern side of which a breakwater has been run out, sheltering a pier within, where vessels frequently unload and refit, grounding, however, when the tide is down. In this part of St. Aubin bay the sea at low water springs recedes half a mile from the shore.

Several rocks lie scattered in the immediate vicinity of St. Aubin castle in a southerly and westerly direction from it, but most of them appear at low water. The two largest and most conspicuous rocks, Grosse and Platte, lie very close together, about a quarter of a mile from the castle; the former is the highest and is visible at about first quarter ebb,—each is marked with a beacon pole. There is also a group of rocks a quarter of a mile southward of the Grosse, the north-easternmost of which is 7 feet above the surface at low water. All these rocks will be cleared on the east side by keeping La Haule house open eastward of St. Aubin castle breakwater; eastward of this line the ground is all fine sand. At half flood the depth inside St. Aubin castle pier is 8 feet, at which period the water begins to flow into the entrance of St. Aubin inner harbour. The passage inside St. Aubin castle is not passable for boats until half flood.

**LA ROQUE POINT.**—From St. Helier to La Roque point, the south-eastern extremity of Jersey, the distance is 3 miles in the south-easterly direction. A bed of rock extends from it, throughout its whole extent, to the distance of nearly  $1\frac{3}{4}$  miles, and has close to its edge a depth of 6 to 7 fathoms; upon it are several rocks always above water, and the greater part of it is dry at low tide. Two stone towers on it (Icho and Seymour) are valuable as sea-marks; Icho tower is 3 miles south-eastward from St. Helier, and Seymour tower about a mile south-eastward from La Roque point.

The extensive bank surrounding La Roque point, and which extends from it 3 miles in a south-easterly direction, is known as the Violet bank. Upon it are many sharp-pointed rocks, awash or nearly so, and as these are met with even near its edge, it must be approached only with extreme care. From half-flood to half-ebb the tide flows over it with considerable strength.



**GROUVILLE BAY.**—Grouville bay (on the eastern side of Jersey, between Seymour tower and Mont Orgueil castle) is a safe place of refuge from northerly, westerly, and south-westerly winds to those acquainted, but a stranger must have the assistance of a pilot on account of the numerous dangers which prevent a free ingress. Mont Orgueil castle on the high promontory in the north-west part of the bay (which is joined to the island by an isthmus) has a stately appearance; under it there is a pier for the shelter of small vessels,—a small *fixed* light is on the extremity of this pier.

The best position in Grouville bay in which to anchor is with Grouville church nearly in line with fort Henry, and St. Catherine Martello tower in one with Archirondel tower, in not less than 5 fathoms, rocky bottom with pieces of shells.

There are two passages into Grouville bay. The northern, between Equerrière rock (off Mont Orgueil castle) and the Banc du Chateau has for its leading mark Grouville mill in line with the south side of Mont Orgueil bluff, bearing W. by S.  $\frac{3}{4}$  S., until La Coupé guard-house is in one with the breakwater-house on Verclut point, N.  $\frac{1}{2}$  W.; the latter mark will then lead into the outer roadstead, steering S.  $\frac{1}{2}$  E.

**Banc du Chateau.**—The Banc du Chateau, consisting of coarse sand and shingle, mixed with pieces of shells, lies about half a mile outside the anchorage in Grouville bay. It extends N. by W.  $\frac{1}{4}$  W. and S. by E.  $\frac{1}{4}$  E. (including the depth of 5 fathoms) 2 1-10th miles, is about  $3\frac{1}{2}$  cables across, and very shallow throughout nearly its extent, some parts of it being almost awash at low water. The middle and shoalest part of the bank lies with Grouville church and fort Henry in line, and Mont Orgueil castle N.W.  $\frac{1}{2}$  W.  $1\frac{1}{2}$  miles distant.

The southern passage into Grouville bay is between the Banc de Violet, the Anquettes, &c. The detached sunken rocks off the south-east end of Jersey are so numerous that a stranger should not attempt to pass through the channels among them; hence it is useless to supply instructions for approaching it.

**ST. CATHERINE BAY.**—St. Catherine bay, northward of Mont Orgueil castle, though much encumbered with rocks, affords good anchorage in 12 to 30 feet water, bottom of muddy sand, grass, and seaweed, with shelter, by the aid of the breakwater, from N.E., North, West, and S.W. winds, but S.E. and East winds blow right in, and at high water there is a short, turbulent, chopping sea; in proportion, however, as the tide recedes the sea subsides. A leading wind is necessary for the navigation of this bay, on account of the numerous dangers scattered over its southern part.

A *fixed* light, shown from an octagonal iron structure on the end of the breakwater, at 60 feet above the sea, is visible 7 to 10 miles.

**BOULEY BAY.**—Bouley bay, on the northern side of Jersey, between Rozel tower and Belle Hougue point, affords good shelter from any wind between W. by N. round southerly, and S.S.E. The only dangers in and near this bay are the Oyster rocks, Troupeurs, Sambues, and a small rock known as the Grune de Vicard.

The *Oyster* rocks lie within the Troupeurs, distant  $1\frac{1}{2}$  cables from Meulet point, and dry 13 feet in height at low water.

The *Troupeurs* lie near the middle of the bay, outside the Oyster rocks. They may be described as a small rocky bank, having two heads, distant from each other about one-third of a cable, nearly N.E. and S.W. The outer head has 10 feet water over it, and the inner only 7 feet, at low water springs. On the outer head, the inner high rock of the Pierres de Lecq appears a little open of Belle Hougue point, bearing N.W., and the west side of Meulet point in line with the west side of the high cliff immediately above it, S.S.W. These rocks may be cleared on their north

side by keeping the whole of the Pierres de Lecq well open of Belle Hougue point; and on their south side by shutting in the largest rock of the group (near the middle) behind Belle Hougue point.

The *Sambues* lie off and eastward of Belle Hougue point, distant nearly a quarter of a mile from the shore, and appear soon after half ebb. La Coupé guardhouse turret, just open outside (or north-eastward) of Nez du Guet and Rozel tower, bearing S.E. by S., leads clear outside of both the Sambues and Troupeurs.

The *Grune de Vicard* lies nearly a cable from the shore, between the two guard-houses, and is 2 feet under the surface at low water springs.

Vessels may anchor in 8 to 10 fathoms, gravel, outside the Troupeurs, with the whole of the Pierres de Lecq at least a point open of Belle Hougue point; La Coupé open of Rozel tower; and the white tower of Castle house (on the high land overlooking the bay) in line with Bouley pier, S.W.,—or, further in, in 5 fathoms, fine sand, with the white tower of Castle house open of the pier, bearing S.W. by W.; and Belle Hougue point a little open of Vicard point, N.W. by N. This is a safe anchorage in southerly winds, but open to those from northward. Vessels at anchor during S.W. gales should therefore be prepared to weigh directly the wind begins to veer to the N.W., and proceed either to St. Catherine bay or Gorey road (Grouville bay).

**Shamrock Bank.**—The Shamrock, a reef 2 cables in diameter, discovered in 1866, lies North from Fremont point, distant nearly three-quarters of a mile. The least depth obtained (9 feet at low water springs) is on the inner part of the bank, and the depth close to it on all sides was 7 and 8 fathoms. On the 9-foot rock, Plemont hotel is seen just within the outer part of Romez point, W. by N.  $\frac{1}{2}$  N., and the western house of St. John's barrack is a little open of Fremont point, S.  $\frac{1}{2}$  E.; these marks may be used for passing either side of the bank.

**TIDES on the Coast of Jersey.**—On the south side of the island, between it and the Minquiers, the stream of tide from high water to 2 hours' ebb sets N.N.E.  $\frac{1}{2}$  E.; from 2 hours' to four hours' ebb N.  $\frac{1}{2}$  W.; and thence till low water N.W. From low water till 2 hours' flood it runs S.S.W.  $\frac{1}{2}$  W.; from 2 to four hours' flood S.  $\frac{1}{2}$  E.; and from this period until high water S.E. The ordinary rate of springs is 5 and 6, and of neaps  $2\frac{1}{2}$  to 4 knots.

In the Ruau channel, between La Coupé, the north-east extremity of Jersey, and the Drouilles and Ecrehos rocks, the tide runs fair both ways, that is, from 5 hours' flood till 5 hours' ebb the stream sets N. by W., and *vice versa* from 5 hours' ebb till 5 hours' flood. During springs the rate is about 5 knots an hour, and neaps 3 knots.

## BANKS AND ISLETS BETWEEN JERSEY AND FRANCE.

In the vicinity of Jersey are numerous rocky banks and dangerous ledges (for the most part above water when the tide is down) which we shall describe only in very general terms, as the chart can alone impart an accurate knowledge of their nature and extent. The principal of these are the Pierres de Lecq (mentioned on p. 174) Drouilles, Ecrehos, Fruquier-Aubert, Anquettes, Chaussée des Bœufs, Minquier rocks, Chausey islets, &c.

**DROUILLES.**—This group of rocks lies north-eastward of Jersey, and westward of the Ecrehos, from which they are distant about  $3\frac{1}{2}$  miles; they are also nearly the same distance from La Coupé point. The channel between them and the island is very deep, and free from danger at all times of tide, though the ebullition is so violent as frequently to resemble breakers. The mark to clear the western extremity of

these rocks is Verclut point shut in by that of La Coupé, S.  $\frac{3}{4}$  E., or Rozel mill well open westward of Rozel tower, S. by W.

The channels between the Drouilles and the Ecrehos, although sufficiently deep at low tide to permit the passage of vessels of considerable draught, are so tortuous in direction that considerable local knowledge is required to navigate them in safety, even in vessels drawing but little water. The principal of these channels is that named Etoc.

**ECREHOS ROCKS and ECREVIÈRE BANK.**—These lie nearly in mid-channel between the north-eastern point of Jersey and cape Carteret (France). The Ecrehos are for the most part a cluster of low, long, rugged, sharp-pointed rocks, interspersed with, and connected by, ledges of very large shingle, branching in all directions from the large rock known as Maître isle, which together with the Marmotier, Taupier, Colombière, Grande and Petite Rousse, and others, never cover. There are a few scattered huts on Maître and Marmotier (the two largest islets), to which the natives of Jersey resort during the fishing and kelp seasons; these two islets also afford shelter to small boats and their crews against the occasional inclemency of the weather, but neither sustenance, fuel, nor fresh water can be obtained from either.

The Ecrevière bank, the south extremity of which (taking 5 fathoms as its limits) lies S. by E.,  $1\frac{1}{2}$  miles from Ecrevière rock, the south-easternmost of the Ecrehos. Its greatest breadth, near the north end, is half a mile, and it tapers off to less than a quarter of a mile at its south extremity.

This bank is very steep along its western side. Its apex consists of a number of semi-detached fine gravel and sandy ridges (convex on the south-west side), lying nearly parallel to each other, and drying 3 to 5 feet in height at low water, which are separated only by small narrow channels 3 to 8 feet deep. The streams setting over it cause a confused sea in bad weather.

Bigorne rock\* and Tas de Pois (both in the Ecrehos group) in line mark the direction of the south extremity of the bank; hence by opening these objects of each other a point either way the end of the bank may be rounded as necessary.

Grouville mill in line of Orgueil bluff passes over the bank a quarter of a mile within its southern extremity, where it is awash at low water; therefore, to clear the south end of the bank, open Grouville mill a little to the southward of Orgueil bluff, bearing W. by S.,—or bring Rozel mill in line with (or a little open southward of) Coupé turret, W.  $\frac{3}{4}$  N.

The Ecrehos and Drouilles are upon an extensive ledge, which is  $7\frac{1}{2}$  miles long, in a N.W. and S.E. direction, and 2 miles wide where broadest. The greatest depth in the channels dividing them is 8 fathoms, but as they are confined in width, and full of hidden dangers, only those having good knowledge of the locality can use them. The channel between this ledge and the Feles banks, off the French shore, is described subsequently.

**FRUQUIER-AUBERT and ANQUETTES.**—These lie south-eastward of Jersey. The former of these clusters of rocks occupies a space of about 2 miles in length, and  $1\frac{1}{4}$  miles in breadth, and is separated from the Violet bank (Jersey) by a channel three-quarters of a mile wide and  $5\frac{1}{2}$  to 6 fathoms deep, and from the Anquettes by another of about the same width, but encumbered with several rocky patches. To go clear westward of the Fruquier-Aubert, vessels should not approach them nearer than when St. Pierre church is in one with Elizabeth castle, about N.N.W.  $\frac{1}{4}$  W.; La Moye

\* Bigorne rock, a remarkable horned rock about half a mile south-eastward of the Marmotier, is 54 feet high at low water.



signal-post open of Le Fret point, N.W., is also a good mark for clearing them, but not at so wide an offing. The Anquettes (including the southern Anquettes) extend about 6 miles in a N. by W.  $\frac{1}{2}$  W. and S. by E.  $\frac{1}{2}$  E. direction, and are about  $1\frac{3}{4}$  miles broad. There are three off-lying patches of 12 to 18 feet water, on the north-eastern and eastern sides of the Anquettes, at distances varying from half to  $1\frac{1}{4}$  miles therefrom; these, as well as the Banc du Chateau before mentioned, should be guarded against when sailing to or from Grouville bay and the opposite coast of France.\*

In using the channels between Jersey and the Fruquier-Aubert, Anquettes, &c., great precaution must be used on account of the many rocky patches that obstruct them. In the passage between the Fruquier-Aubert and the Anquettes, there are several rocky ledges exactly in the fairway of the channel (two of which are precisely upon the given leading marks) whereon at low water the depth is not more than 5 and 12 feet respectively. Being in Grouville bay, therefore, and bound south-eastward through this passage, delay to get under way, if possible, till one-quarter flood at least, for then there will be 10 feet water over these ledges,—calculated for great spring tides.

**ICHO BANK.**—This bank (an irregular ridge, in a N.N.W. and S.S.E. direction) lies S.W.  $2\frac{1}{2}$  miles from Icho tower. It is about  $4\frac{1}{2}$  cables long, and  $1\frac{1}{2}$  cables broad. The least water on it ( $2\frac{1}{2}$  fathoms at low water springs) is at its northern extremity, and from this shoal spot La Platte Roque tower is just seen on the west side of Icho tower N.E.  $\frac{1}{2}$  E. (easterly); and St. Peter's church spire in line with Lower Blanc Pignon house, N. by W.  $\frac{1}{4}$  W. On other parts of the bank the depth is 4 to 5 fathoms at low water springs. The channel between Icho bank and the rocks fronting Icho tower is 2 miles wide, 7 to 8 fathoms deep, and free from any known sunken dangers.

**CHAUSSEE DES BŒUFS.**—The western part of this dangerous group of rocks is about  $8\frac{1}{2}$  miles S.E. from La Roque (Jersey) and 2 miles south-eastward of the Anquettes; its eastern end is nearly 6 miles from the French coast. It is 4 miles in length and  $1\frac{1}{2}$  miles in breadth;—some of the rocks appear at 4 hours' ebb, some at low water only, while others remain always covered. In the neighbourhood of the rocks, especially on their north, south-west, and west sides, the ground is very foul, and contains many sunken dangers.

Near the south-west side of the Chaussée des Bœufs there is a detached rock with only 4 feet over it at low water, which lies about W.N.W. distant 1 mile from the northern Bœufins, a rock 7 feet in height at low tide. From this sunken rock Princes tower, or Tour d'Auvergne, appears a little open eastward of the Grande Anquette N.W. by N.; La Coupé turret guard-house in line with St. Catherine's break-water lighthouse N.N.W. (westerly): and Bergerie chimney in line with La Rousse rock (inside Icho tower) N.W.  $\frac{3}{4}$  W.

La Roque tower W. by N.  $\frac{3}{4}$  N. leads clear northward of all the rocks (including Bœuf patch), in the vicinity of the Chaussée des Bœufs; Hatainville sand hills shut in by cape Carteret, N. by E., leads eastward of them; and a remarkable tree on Mont Huchon (France) in one with a sandy point E. by S.  $\frac{2}{3}$  S., clears them (and also the southern Anquettes) on the southern side. The passage between the Anquettes and the Chaussée des Bœufs should be avoided if possible; if compelled to take it, the utmost caution is necessary, particularly in a large vessel.

The sea southward of the Anquettes and the Chaussée des Bœufs, as far as the Chauey islets, is so much encumbered with sunken rocks and banks, that when the weather is boisterous the whole appears to be one sheet of broken water.

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\* A stone beacon marking the northern end of the Grande Anquette has lately been washed away, but will probably be replaced. [February, 1868.]

**MINQUIERS.**—The most important of the dangers between Jersey and France is the Minquiers, which consist of numerous rude, irregular, and dreary rocks, rising, as it were, like needles out of the sea, and connected by ledges of shingle and sand, and beds of mud. The space occupied by them is about 15 miles from east to west, and 9 miles from north to south. A few of the rocks are always above water, viz., Maitresse isle, Maisons, Calfafeurs, Blanc Roque, Rochez du Nord-est, and the Faucheurs to the south-westward; the greater part, however, show at low water, though there are many constantly covered. Maitresse isle, on the eastern part of the ledge, is about 100 fathoms in length and 50 in breadth, and is 72 feet high at high-water neap tides. The Maisons, on the western part of the ledge, are not quite so high.

South-eastward of Maitresse isle there is a small roadstead or cove, which dries at low water, but which is capable of affording partial shelter to one or two small vessels against north-westerly and westerly winds, and there is a hut built on the island (for the use originally of the stone-cutters), but which now serves as a refuge for the fishermen and vrachers, who occasionally frequent this deserted spot. There is, however, neither fuel, sustenance, nor fresh water (except what the rain casually deposits in the interstices of the rocks).

There are many temporary anchorages for small vessels, within and among the Minquiers, as well as very intricate passages through them at high water, indeed, even at flood-tide; but it has not been found possible to give any leading mark for either, capable of being understood by a stranger, the rocks being so completely interwoven one with the other, and most of them covered at half-flood; neither do any two objects on the island of Jersey happen in any instance to be suitable for the purpose in question; hence it is to be hoped that no vessel will ever be so unfortunately circumstanced as to be compelled to adopt the distressing alternative of running through them, without a sufficient knowledge of the place, and a practical experience of the tides.

The Derée (a cluster about a mile westward of the Maisons, from which it is detached) appears at half-ebb, or rather before, instead of being always uncovered, as is generally supposed. This group of rocks is by no means the western of the Minquiers, neither is it the south-western; there being several sunken rocks south-westward of it, at the distance of  $4\frac{1}{2}$  miles, and two heads  $1\frac{1}{2}$  miles northward of it, besides a 3-foot spot  $2\frac{1}{4}$  miles north-westward, and one westward of it at the distance of  $1\frac{1}{3}$  miles. The greatest depth of water among all these rocks, at low tide, does not exceed 7 or 8 fathoms, and the bottom is alternately gravel and rock.

Between the Derée and Maisons there is a passage for small vessels, nearly  $1\frac{1}{2}$  miles in breadth, through which, at half-flood, the depth is not less than 19 feet; as there are several rocks, however, north-westward, westward, and south-westward from the Maisons, which appear at low water, and nearly in mid-channel, the attempt to run through the channel before that period would be attended with almost certain destruction, as it would also be after half-ebb.

The Minquiers should not be approached on their western side nearer than when St. Pierre church is in one with the white signal-house on La Moye, or St. Ouen church is in one with (or open westward of the point of land at the Corbière); the latter will carry at least 3 miles westward of all danger in the neighbourhood of the Derée, and in a depth of not less than 18 fathoms. The white sand under L'Etac will, on this occasion, also be open westward of the Corbière, and if the sum of the horizontal angles round the horizon eastward, between cape Frehel lighthouse and the Maisons, and between these latter again and the Pule (or north-western extreme of

Jersey) does not exceed  $148^\circ$  the vessel will be westward of all danger in the vicinity of the Derée, but if the two angles exceed that quantity, too close. The above directions and angles are more particularly to be attended to between low and high water, with light winds, because of the south-eastern inclination of the tide, which sometimes attains the rate of 7 knots. Between high water and 5 hours' ebb St. Ouen church may be brought within a sail's breadth of the white signal-house on La Moye, N.E.  $\frac{1}{2}$  N., or the above-mentioned angles may be increased to  $162^\circ$ , but no more; the vessel will then be within a mile of the rocks. On losing sight of these marks, bring the mill of Ter Morgan (on high land, inland from cape Frehel in a southerly direction) open westward of Amas du Cap, the same distance as that huge rock is westward of the lighthouse, S. by W.  $\frac{3}{4}$  W.; this will carry more than a mile westward of all danger in that neighbourhood. Grand Larron tower,\* touching the eastern end of Cezembre island S. by E.  $\frac{1}{3}$  E., clears the Minquiers on the south-west side.

The extreme southern rocks on the southern side of the Minquiers are, the Four, the Souardes, and the Sauvages. The *Four* is 5 miles nearly south from the Maisons, and appears at half-ebb. The *Souardes* are  $1\frac{3}{4}$  miles further eastward than the Four, and  $4\frac{1}{2}$  miles S.W. by S.  $\frac{1}{2}$  S., from the Maitresse isle. And the *Sauvages* 2 miles still further eastward, and nearly N.W. by W.  $\frac{1}{4}$  W. from the old fort on Chausey, about  $5\frac{3}{4}$  miles distant; these rocks show at low water equinoctial tides. The *Suhal* lies about three-quarters of a mile northward of the Souardes, and appears at 4 hours' ebb. Chausey castle well open southward of the Corbière, E.S.E. (nearly) leads southward of the Sauvages and Souardes. When rounding the Minquiers the tide must be most carefully considered.

On the eastern side of the Minquiers are the Ardentes and Caux de Minquiers. The former consist of shells and large stones, with some rocky heads rising from their eastern part, and are about  $2\frac{3}{4}$  miles in length from E. by N. to W. by S. and about half that in width; their western edge (6 feet water) is N. by W.  $\frac{1}{4}$  W.  $5\frac{1}{4}$  miles from isle Chausey, and S.E. by E. 6 miles from Maitresse isle;—on all sides they are steep, and there is a swatchway of 6 and 7 fathoms through them. About  $1\frac{1}{4}$  miles N.W. by N. from the west extremity of the Ardentes is another bank, the least water upon which is 12 feet; the channel between is 6 to 8 fathoms deep, and may be taken by keeping Seymour tower (Jersey) rather nearer Gorey church than Mount Orgueil castle, bearing N.  $\frac{1}{2}$  E.

The Caux de Minquiers are very extensive shelves of sand, shingle, and rocks, which are promiscuously scattered in almost every direction between east and north from Maitresse isle; the principal direction, however, is north-eastward, in which position some of the most dangerous exist, and are distant from Maitresse isle nearly 6 miles. The small channels between all these and the Minquiers are scarcely navigable at low water, except for boats; the safest and most frequented passage is to the north-eastward of the whole. The northern and eastern boundary of this group is steep, having at least 9 to 10 fathoms within half a mile of them. Most of the rocks on the Caux show at low water.

In the passage between Chausey islets and the Minquiers, the depth when not interrupted by banks, is moderately regular; near to the former islets it is 6 and 8 fathoms, and the water gradually deepens in a westerly direction; close to the south-eastern edge of the Minquiers it is 14 to 17 fathoms; but thence it very suddenly decreases to 20 feet in several places, and in others to much less.

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\* The Grand Larron is a signal-tower among the trees on the heights over St. Servan, and is very conspicuous; there is a flagstaff in the centre of it.



*Lightvessel*.—The lightvessel (painted black, and carrying a skeleton ball of the same colour at each mast-head) moored off the south-west end of the Minquiers bank shows *two fixed* lights at 39 and 26 feet above the sea, visible 8 or 10 miles. In foggy weather a bell is sounded. Its geographical position is lat.  $48^{\circ} 53' \text{ N.}$ , long.  $2^{\circ} 17' 21'' \text{ W.}$

**CHAUSEY ISLETS.**—The little islands of Chausey are an assemblage of islets and rocks, of various heights and dimensions, extending in almost all directions, and occupying a space of nearly 12 square miles; the principal or largest of them is on the southern side, and may be distinguished by the ruins of a small fort and by a lighthouse on its south-east point. The anchorage generally resorted to by ships of war is south-east of port Marie. There are several small harbours within and among these rocks, completely sheltered against all winds that blow; but the principal one is formed by Chausey isle to the south-westward, and the Puceaux, Longue isle, and other rocks to the north-eastward. It is, however, very narrow as well as difficult of access, and only frequented by fishermen, vrachers, and stone boats, capable of taking the ground.

*Light*.—The lighthouse shows (at an elevation of 121 feet above high water) a *fixed* light, varied by a *red flash* every *four minutes*, which is visible in clear weather about 15 miles. In ordinary weather the eclipses do not appear total within the distance of 6 miles. It is a life-boat station.

**Chausey Harbour.**—Chausey harbour has two entrances; one on the south-eastern side, between the Bec de la Tour and the Epiettes, and the other in the north-west quarter between L'Enseigne and L'Etardière. L'Enseigne is a small islet  $1\frac{3}{4}$  miles northward of the Bec de la Tour, and is remarkable by the uniform convexity of its surface, as well as by a small rough beacon, or obelisk, on its summit. The former entrance is the better, on account of its simplicity; for no marks capable of being understood by a stranger can possibly be given for the latter.

Vessels entering Chausey harbour from southward, should bring the beacon on L'Enseigne open eastward of the land et La Tour (but only just in sight),  $\text{N. } \frac{1}{2} \text{ W.}$ , and, keeping it thus, should run boldly in over the Banc de la Tour, between the beacon on the south-west end of the Epiettes and the island, and keeping exactly in mid-channel, should anchor as soon as the village comes in sight, and wait for low water to place the vessel. Part of the Banc de la Tour dries when the tide is down, but at 2 hours' flood the depth in mid-channel is not under 12 feet; the deepest water is on the Epiettes side.

**Port Marie.**—Port Marie is a creek on the west side of the lighthouse point, the Bec de la Tour. Outside it there is moderately good anchorage in 7 or 8 fathoms or more (according to the wind and vessel's draught) at half a mile or a mile from the island, with the old castle bearing about N. by W.; small vessels anchor closer in. From this anchorage Coutances cathedral appears open northward of the Grand Nuguenans, and L'Enseigne is in sight eastward of Point de la Tour; the shelter is from winds northward of N.W. by N., as the rocks trend out a considerable distance south-westward from the island. If the wind be inclined to draw more westerly than N.W. by N., with an appearance indicating bad weather, it is recommended to embrace the first opportunity of getting under way and proceeding to windward with the ebb, or to run either into Cancale bay, where good shelter may be obtained under Grand Herpin, or to get eastward of the Chausey islands, and anchor under the Foraines or the Grande Canue, as the wind may make it necessary. With the wind between N.W. by W. and N.N.E. the anchorage under the Foraines is to be preferred; the mark for this anchorage is the old castle on Chausey island in one with the Huguenans, and distant from the latter  $1\frac{1}{4}$  miles, in 6 or 7 fathoms water. With the

wind southward of West, the anchorage under the Grande Canue, should be resorted to; the mark for it is Chausey island in one with the Grande Canue, and distant therefrom one-half or three-quarters of a mile, in 5 fathoms water.

It may be remarked, generally, that along the whole of the northern side of the Chausey islands there is shelter from southerly, south-westerly, and south-easterly winds. Usually the rocks may be safely approached to a very short distance, there being nearly always a depth of 5 to 7 fathoms in their immediate vicinity.

It is high water (full and change) at Chausey island at 6h. 9m.; the mean rise of springs is 35 feet, and of neaps 17 feet,—equinoctial spring-tides rise 46 feet.

#### CAPE LA HAGUE TO OUESSANT ISLAND.

From cape La Hague the coast trends S.S.W. 3 miles to the Nez de Jobourg, a projecting point 300 feet high and consequently visible from a considerable distance; this headland is fronted by rocks to some distance from it, and on that account must be very carefully approached, the foul ground extending fully a mile from the land. Between the Nez and cape La Hague there is an anchoring place known as the Great Cove, which affords shelter, in 4 or 5 fathoms, from winds coming from the N.E. and S.E. quarters; in taking it caution is required to avoid the Greniquet rock (on the north side), and the rocks and shallows extending westward and north-westward from the Nez de Jobourg (on the south side).

From the Nez de Jobourg the coast runs southerly about  $9\frac{1}{2}$  miles to cape Flamanville; the space between, known as the bay of Vauville, affords good anchorage in 4 to 12 fathoms, on fine hard sand, and shelter from all winds coming from between the N.E., East, and South quarters. The principal dangers to be feared in proceeding along the land, besides those extending from the shore between the Nez and Vauville, are the Basses St. Gilles, Huquets de Jobourg, and Huquets de Vauville.

*Basses St. Gilles.*—These dangerous rocks lie S.W.  $\frac{3}{4}$  W., distant  $1\frac{1}{2}$  miles from the Nez de Jobourg. On their shoalest part the depth is only 6 feet, and near them are two patches of 6 and 18 feet respectively; these lie one-third and two-thirds of a mile outside them in a similar direction from the point.

*Huquets de Jobourg.*—The Huquets de Jobourg (known also by the name of Trepieds), the north-western of which bears S.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  miles from the Nez de Jobourg, are more extensive than the Basses St. Gilles, and have several heads of rock which become dry at low water.

*Huquets de Vauville.*—These are some rocks dry at low water, about half a mile eastward from the Huquets de Jobourg. From them the extremity of the Nez de Jobourg bears N.  $\frac{3}{4}$  W. distant about 2 miles. The cluster is very small, and close to it on all sides is a depth of 7 and 8 fathoms.

The Basses St. Gilles, Huquets de Jobourg and Huquets de Vauville may all be avoided on their western side, by not approaching them nearer than when the pitch of cape Rosel appears well open of cape Flamanville, bearing S.  $\frac{1}{2}$  E. Between them and the rocks lining the coast eastward of the Nez de Jobourg—namely, the Ronde, Brequets Foraine, Sidman, and Hutriere, there is a passage a mile wide and 8 to 10 fathoms deep; but vessels, unless compelled by adverse circumstances, should always pass westward and southward of the St. Gilles and Huquets de Jobourg, and thence proceed to the anchorage in Vauville bay as convenient.

The coast of Vauville bay eastward of the Nez de Jobourg is clifty as far as the Hutriere rock, which is three-quarters of a mile northward of Vauville; it then becomes low, and continues with sandy downs or hills 5 miles, being fronted at low water by a

dry sand which extends out in some parts one-third of a mile,—behind this beach the land becomes more elevated.

**DIELETTE.**—Dielette is a small but important place in the southern part of Vauville bay, about 2 miles north-eastward from cape Flamanville. It has a stone pier 600 feet long for the protection of vessels from the seas sent on the coast by westerly gales, and another, 130 feet long, partially shelters them against those from north-eastward. The entrance (which dries when the tide is out) is between two ledges of rocks, is 650 feet long, and about 420 feet wide, but is difficult to take in bad weather. The port suffers from the frequent accumulation of sand, which is occasionally carted away.

*Lights.*—On the jetty-head and also at the end of the harbour there is a small *fixed* light visible 5 and 9 miles; the latter is *red*. These are 23 and 75 feet high, 169 yards apart N.W. and S.E., and when in a line lead into the harbour.

Outside the harbour the anchorage is good in 4, 5, and 6 fathoms, sandy ground. As the tide, both ebb and flood, makes the circuit of Vauville bay, that is, sets in towards its centre, it is best not to anchor at low water within 2 miles of the beach.

Westward of port Dielette the coast loses its level appearance, and becomes cliffy, and trending westward forms cape Flamanville, a high and bluff point. Thence to cape Carteret the land near the shore is high, and appears double, with several churches and mills upon it. At cape Flamanville some rocks extend out nearly half a mile, and also at point Rosel,  $3\frac{1}{2}$  miles southward of the cape; at the latter point, the steep edge of the bank ( $2\frac{3}{4}$  fathoms) extending from the land is about a mile from the coast. About midway between point Rosel and cape Carteret are the Bancs de Surtainville.

*Bancs de Surtainville.*—The Bancs de Surtainville (some dangerous shoals, the outermost of which is nearly 3 miles from the coast) are 6 to 18 feet under water, and have close to them a depth of 6 to 10 fathoms. The outermost and shallowest patch lies S.S.W.  $\frac{1}{4}$  W.  $5\frac{1}{4}$  miles from the extremity of cape Flamanville, and N. by W.  $\frac{3}{4}$  W. the same distance from cape Carteret lighthouse. Vessels running down the coast should keep cape La Hague lighthouse well open westward of the Nez de Jobourg to pass outside the shoals clear of all danger.

Between the Bancs de Surtainville and the shore the depth is  $3\frac{1}{2}$  and  $4\frac{3}{4}$  fathoms for the space of nearly a mile. If proceeding towards the shore hereabout by the lead (in which implicit confidence should not be placed), remember that within the depth of 6 fathoms the water shoals suddenly.

**CAPE CARTERET (Light).**—The tower on cape Carteret shows a *revolving* light, which attains its greatest brilliancy every *half minute*, at 262 feet above the level of high water at spring tides; this light is visible at the distance of 18 miles in clear weather, and its eclipses are total only beyond the distance of 8 miles.

A bank, on the outer edge of which the depth is 3 fathoms, surrounds cape Carteret, and extends out from the coast  $1\frac{3}{4}$  miles. On this, at a short distance northward of the lighthouse, and at a moderate distance from the shore, are some rocks dry at low water, known as the Roches du Rit,—the sea occasionally breaks very heavily on these rocks, and at such times their outer edge (three-quarters of a mile from the beach) is not unfrequently sharply defined.

**Carteret.**—The little haven of Carteret is on the south side of the cape, at about three-quarters of a mile from the lighthouse. It is a shallow sandy place, fit only for small craft, which are protected by a dike of clay and a barrier of rocks. The best position for anchoring under the cape is with the telegraph on its summit just open northward of the fort on its western pitch, and distant 2 miles, in 4 fathoms of water.

*Trois Grunes.*—The Trois Grunes lie  $3\frac{1}{3}$  miles W. by N.  $\frac{1}{4}$  N. from cape Carteret, and



consist of a dangerous rocky ledge, composed of numberless small rocky heads and large stones; the danger is about a mile in length and half a mile in breadth, trending north-westerly and south-easterly, and appears at low water spring tides; close to it on all sides is a depth of 6 to 8 fathoms. The overfalls in the vicinity of these rocks are very violent.

*Taille-pieds and Bancs Feles.*—Nearly midway between the Ecrehos rocks (see page 188) and cape Carteret is a ridge of coarse sand and shingle, known as the Bancs Feles, which dries in three places at low water, great spring-tides. It extends south-easterly 4 miles (from 2 fathoms to 2 fathoms) and is remarkably steep on its eastern and western sides. The north-western part of the bank (composed of numerous rocky heads, known under the general name of Taille-pieds) is connected with the southern part by small knolls of coarse sand and shingle. Plemont point (Jersey) well open southward of Maître isle W. by N.  $\frac{1}{2}$  N. is the mark for the southern extremity (2 fathoms) of this bank, and Mont Orgueil castle in one with the Maître isle, S.W. by W., is the mark for its northern (4 fathoms) part. Between this bank and the Ecrehos rocks there is generally a turbulent sea, even in fine weather, caused solely by the rapidity of the tides.

**FELES CHANNEL.**—The channel between the Feles bank and Ecrehos is much deeper than that between the Feles and the French coast, but the latter is to be preferred on account of the excellent leading mark there is through it. There is no leading for the other channel, and in many parts of it are small heads of rocks, difficult to avoid at low water.

Vessels bound through the Feles channel from the vicinity of cape Flamanville should steer along the land at the distance of about  $2\frac{1}{2}$  miles from the temporary low-water mark, minding as they advance to guard against the Bancs de Surtainville, the Roches du Rit, and the Trois Grunes. When the lighthouse on cape Carteret bears East, they will be southward of the Roches du Rit, and also through the channel between them and the Trois Grunes, and must then haul in towards the land to avoid the Taille-pieds rocks, as well as to bring the objects together which constitute the leading mark between the Feles bank and the French coast—namely, the north-western peak of the lofty light coloured sands of Hatainville (which are very extensive), shut in by the dark bluff and nearly perpendicular point of cape Carteret, N.  $\frac{1}{2}$  E. (nearly),—which will carry them over the tail of the bank in 15 feet at low water, great spring-tides.

A large ship, therefore, desirous of passing between them, must of necessity anchor to wait for water; not only because of the hidden dangers, but because there is actually not sufficient water on the flat or bridge, until one-quarter at least of the flood has run, at which period there will be a depth of not less than 24 feet in the fairway (upon the above leading mark) and not less than 7 feet over the shoalest part of the Feles, calculated for great spring-tides. The best position for anchoring under cape Carteret, as already observed, is the telegraph on the summit of the cape just open northward of the fort on its western pitch, and distant about 2 miles, in 24 feet water. Vessels may also anchor on the southern side of Feles bank upon the Feles channel leading mark, with St. Germain church between E.S.E. and E. by N. in 3 to 7 fathoms.

**The Coast.**—From cape Carteret to St. Germain the coast trends S. by E.  $\frac{1}{4}$  E., nearly 12 miles, and thence to Granville S.S.W.  $\frac{1}{4}$  S. 23 miles. It contains some harbours that become dry at low water, and the sea generally breaks upon it with such violence during strong westerly winds, that no vessels, however distressed, should attempt running on shore so long as they have an anchor and cable on board, for should they do so, all on board would inevitably perish.

**PORT BAIL.**—About 3 miles South from cape Carteret lies Port Bail roadstead, where is good riding with N.E., East, and S.E. winds, in about 3 fathoms. Here a small

*white* light is shown on the sandy point on the south side of the entrance, and a *red* light on the church at Port Bail. The lights are distant from each other nearly three-quarters of a mile N.  $43\frac{1}{2}^{\circ}$  E. and S.  $43\frac{1}{2}^{\circ}$  W. (*true*), and when in one lead into the harbour. The *red* light is shown over an arc of  $30^{\circ}$ .

Surville is about 4 miles southward of Port Bail, and beyond this harbour at a similar distance, is that of St. Germain. Between these harbours are the rocky ledges, known as the Mouilliers and Mortes Femmes, which extend about a mile from the shore. Further on are the Roches du Sac de Pirou on the northern side of the entrance to Pirou harbour. The Senequet rocks are between Pirou and Blainville. The Mouilliers and the Roches de Ronqui, some rocks above water, are near the entrance to the harbour of Regneville.\* Midway between Regneville and Lingreville harbour is the Neuf rock, and between Lingreville and Granville are the rocks of Brehal, l'Ourse, and Chardière; all these are so dangerous, and the shore is so sandy, that no ships ought to ride off the coast with westerly winds.

**SENEQUET PASSAGE.**—This channel is between the rocky bank extending from the coast and the Chaussée des Bœufs. It is about 3 miles wide and 4 to 7 fathoms deep, except on two shoals, the Bœuf patch and the Jourdan bank, on the former of which are but  $2\frac{1}{2}$  and 3 fathoms water, and on the latter only 2 feet. The *Bœuf* patch extends northward and southward  $1\frac{1}{2}$  miles, is narrow, and from its northern (and shallowest) end Seymour tower bears W.N.W.  $\frac{1}{4}$  W. distant 9 miles, and Senequet lighthouse S.S.E.  $\frac{1}{4}$  E.  $5\frac{3}{4}$  miles. The *Jourdan* bank is small and steep, and is marked on its eastern side by a bell-buoy, from which Senequet lighthouse is distant  $3\frac{1}{4}$  miles in a S.E.  $\frac{1}{4}$  S. direction. The north-western peak of the lofty light coloured sand-hills of Hatainville shut in with the dark bluff point of cape Carteret, about N. by E., will clear both these shoals on their eastern side, and lead through the channel.

*Senequet Light.*—The Senequet rocks are an extensive cluster (occupying a space of fully 3 miles) off the shore between Pirou and Blainville harbours. The light-house stands on one of the outer heads, three-quarters of a mile within the eastern boundary of the channel, and 6 miles N. by W. from Regneville light; it exhibits a *fixed red* light, 55 feet above high water, which may be seen in clear weather at the distance of 10 miles.

From the vicinity of the Chaussée des Bœufs and Senequet rocks another leading mark will come into view, when advancing southward, viz., Champeaux point (a bluff perpendicular headland, about 6 miles southward of Granville) which must be kept just in sight westward of the high land whereon Granville stands, bearing S.  $\frac{1}{8}$  W. With this mark on, vessels will pass between the Basse Marie and the Ronquet rocks, and also clear of all danger until nearly as far as Catheue reef; whence, if they intend to pass between Chausey islets and Granville, they must look out for the remarkable tree which stands (or did till recently) about 2 miles to the north of Coutances, and not bring it in one with Agon church until they have stood to the westward and brought the Petite Canue (L'Etat rock?) at Chausey in one with the Huguenans bearing about S.S.W.,—the latter mark will lead westward of the Catheue, a dangerous reef of rocks upon the north-eastern extremity of the Bancs de la Catheue, which shows at low water.

The marks for the Catheue are Coutances cathedral in one with point d'Agon and Chausey lighthouse in one with the Petite Canue.

\* Regneville is a shallow sandy place, suitable only for small craft, situated on the 49th parallel of latitude. Its approach is much encumbered with rocks, and therefore difficult to make. On the Bec d'Agon, the northern point of the entrance, there is a *fixed* light, 33 feet above the sea, and visible 10 miles in clear weather.

Westward of the Bancs de la Catheue the water deepens to 5 fathoms. To pass between them and Chausey islets and reefs, after clearing Catheue rock, keep Petite Canue in one with the Huguenans till Coutances cathedral appears in one with point d'Agon; then steer towards Granville, minding to keep Petite Canue well open northward of Grande Canue (after passing them) until Mont St. Michel appears within twice its own breadth of point Champeaux bearing South,—or until Coutances cathedral comes in one with Mont Martin church, N.E. by E.  $\frac{3}{4}$  E., either of which will lead eastward of the Founet and Admiralty bank. When Point de la Tour (Chausey) opens southward of the Huguenans, W.N.W., haul up for it, in order to avoid the Banc Haguet, or anchor to wait for water, if bound to Granville. At the early period of 2 hours' flood there will be 11 feet water over the Catheue, the Founet, and Bancs de la Catheue.

**GRANVILLE.**—Granville is 28 miles S.S.E. from St. Helier (Jersey) and E.  $\frac{1}{2}$  S., nearly 30 miles from cape Frehel. The port is formed by a jetty of loose stones, and with the lowest tides dries as much as 16 feet in height, the entrance at the same period being 2 to 9 feet above the tidal level. Springs at the equinoxes rise about 46 feet; their range, however, is only 37 feet, and that of neaps only 17 feet. There is a wet dock, with a quay 2300 feet long, and room sufficient for about 70 vessels.

A rock named Loup stands in the fairway of the entrance, just within the low-water line, and covers at half-flood; it is marked by a beacon.

*Lights.*—A round tower, 43 feet high, on cape Lihou (the rock of Granville) shows a *fixed* light at 154 feet above the sea, visible 14 miles. A small *red* light is also shown on the south-east extremity of the new mole, left side of the entrance; it is visible 7 miles.

The navigation in the vicinity of Granville, at the period of low water, is very difficult and dangerous, in consequence of the numerous banks and knolls of sand which bar its approaches. There are twenty-two of these banks in all, but the principal are the Videcoq, Parisienne, Rondehaie, Haguet, Tombelaine, and Cocaleux; some of these dry in places.

*Videcoq.*—The Videcoq (dry at low-water) lies with Granville church in one with the second southernmost chimney of the south-western Caserne, and the Cullassière (at Chausey) nearly in one with the Conchée N. by W.  $\frac{1}{2}$  W. Granville church in one with the northernmost chimney of the south-western Caserne will lead half a mile northward of the rock; the same church in one with the southern chimney thereof will lead a quarter of a mile southward of it; the Mauvaise in one with the Conchée passes half a mile eastward of it, and the same rock in one with the Huguenans will pass half a mile westward of it. A *red* and *black* bell buoy is moored close to the rock, on its eastern side.

*Parisienne.*—The Parisienne (8 feet under water) lies  $5\frac{3}{4}$  miles W.  $\frac{1}{3}$  S. from Granville lighthouse. To avoid it on the northern side bring the church well open northward of the lighthouse, bearing East (southerly); and on the western side, keep the Cullassière rock in sight westward of the Huguenans.

*Banc de Rondehaie.*—This bank lies nearly in the centre of Cancale bay, and  $1\frac{1}{2}$  miles S.E. by E.  $\frac{1}{2}$  E. from the Parisienne. On its north-western end there is a rock with only 11 feet water upon it, and there is still less water on its south-eastern part. Strangers should go northward of the Parisienne by the leading mark already given, and so avoid both dangers.

*Haguet Bank.*—The Haguet bank is long and narrow, and partly dries. Its southern end (in 6 feet at low water) is more than 2 miles from Granville lighthouse, with that building nearly in one with the church steeple; its northern end (4 feet)



lies in line with the churches of Coutances and Mont Martin, and  $3\frac{1}{2}$  miles N.W.  $\frac{1}{4}$  W. from the lighthouse.

**Tombelaine Bank.**—The Tombelaine, also dry in part when the tide is down, extends along the front of the entrance to Granville, parallel to the low-water mark, and is distant therefrom about three-quarters of a mile. Vessels bound into the port need only wait till the flood has run sufficiently to permit them to enter, for they will be able to cross this and the preceding bank without fear, as soon as there is water enough in the port for vessels to lie afloat.

**Cocaleux.**—The Cocaleux, a small bank of sand and gravel, about  $1\frac{1}{4}$  miles to the N.W. by N. of the lighthouse, dries at low water. Between it and the lighthouse there are several small rocky heads, three of which occasionally dry.

Between the Cocaleux and the Tombelaine there is a narrow channel 3 fathoms deep at low water, which decreases to 6 feet as the entrance of the harbour is approached.

When within the Tombelaine and bound into Granville, bring the lighthouse on the south-east end of the new mole open of the fall of the land under the eastern end of the Garrison bluff; or, if intending to pass eastward of the Loup rock, open the church of Granville its own breadth eastward of the lighthouse, in order to pass between the tail of the Loup and the rocks on which the new mole is built, and give the mole-head, when rounding it, a berth of a ship's length only; drop the anchor when convenient, shooting, however, as far westward as possible when within it. A vessel drawing 10 feet water must not attempt to round the mole-head until 4 hours' flood, especially if there be any sea.

**The Coast.**—From Granville to Champeaux point, a distance of 5 miles, the coast is fronted by an extensive shallow flat, with some detached patches outside it, some of which are as much as 3 miles from the shore; consequently, when the tide is out, this part should not be closely approached, especially in a large vessel.

**TIDES.**—Southward of the Chausey islets, and between them and the opposite coast of France, the stream from high water to 3 hours' ebb sets directly towards the Minquiers, nearly N.N.W.;—from 3 hours' ebb to low water, its direction is N.W. by W. From the period of low water until 4 hours' flood it sets E.S.E., but from this time till high water it runs due East. The velocity of springs is 5 or 6 knots, of neaps 3 and 4 knots.

**CANCALE BAY.**—Between Granville and Cancale point the coast falls in and forms a deep bight, named Cancale bay, in which there is a very extensive bank lining the shore, and drying at low water, besides several outlying shoals and rocks. At nearly the head of the bay in its south-east corner stands the remarkable isolated and lofty rock known as Mont St. Michel, which at high tide is completely surrounded with water, but when the tide falls is on dry sand; at the period of low water the sea recedes from it  $6\frac{1}{2}$  miles in a north-westerly direction. On its summit there is a stately edifice, which was formerly a monastery, but now serves as a state prison. Its position and exterior resemble Mount St. Michael in Cornwall.\*

**La Houle.**—At port La Houle, in the western part of Cancale bay, a *red fixed* light, visible 6 miles, is shown from Fenetre rock, in the entrance to the harbour.

**Corbières Rock.**—A rock 8 feet under water, named Corbières, lies  $1\frac{3}{4}$  miles from port La Houle in an E.  $\frac{1}{2}$  N. direction. It is nearly three-quarters of a mile E. by S. from Rimains islet, and almost close to its west side is a depth of 7 fathoms. By keeping Cancale church open northward of Rimains fort, vessels will pass northward of the rock in 15 to 18 feet at low water.

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\* A small *red* light, visible 6 miles, is shown at Mont St. Michel from 2 hours before high water until  $1\frac{1}{2}$  hours' ebb.

*Herpins, &c.*—Several rocks lie off Grouin point, the western boundary of the bay of Mont St. Michel, at various distances, the outermost (the Fille) being 2 miles from the point in an E. by N.  $\frac{3}{4}$  N. direction. Of these rocks, the Herpin\* is the most conspicuous and is also the nearest to the coast; the Pierre de Herpin, three-quarters of a mile N.E. by E.  $\frac{3}{4}$  E. from the Herpin, is dry at half ebb or a little before; and the Fille appears at low water,—this rock is marked on its north-west side by a *red* and *white* buoy. The Pierre de Herpin has a rocky ledge of 10 to 18 feet water projecting from it in a north-easterly direction about  $1\frac{1}{2}$  cables.

Although the channels among the rocks just mentioned are 7 to 9 fathoms deep, strangers bound to the bay of Mont St. Michel should always enter it north of the buoy marking the Fille rock. The channel between the Herpin and Pierre de Herpin is good at all times of the tide, if precaution be taken to keep about a cable from the Herpin when passing it; this is necessary because the flood tide sets strongly over the Pierre de Herpin, and there are two spots of 3 and 18 feet near it, and also because the great height of the Herpin produces occasional flaws.

Under Rimains island there is good riding for a vessel whose draught of water does not exceed 10 feet. When running for this anchorage from the channel between the Herpins, if at low water, she must not give the Herpin and Landes island, south-westward of it, a berth of more than half a mile, to avoid the 9-foot spot on the Banchets; neither must she give Rimains island a berth of more than a quarter of a mile, in order to pass between it and the Corbières, on which the depth is only 10 feet at low water. The best position for anchoring is with the island bearing North, and distant from it half a mile. If unable to ride here in very heavy weather from north-eastward, take the top of high water and run aground with good sail upon the mud southward of Cancale church, where both ship and lives will be saved.

On the eastern side of the Herpin there is good anchorage in 7 to 9 fathoms water, with it bearing about N.W., distant one to  $1\frac{1}{2}$  miles; but the ground is rather coarse.

The coast from Grouin point to St. Malo is bordered by huge rocks and reefs, above and under water, and so many sunken dangers lie scattered off it, at various distances, that if approached at all, it should be with extreme caution. The principal and outermost of these dangers are the Basse Grune, Basse du Nid, Rault, Rochefort, &c.

*Basse Grune.*—The Basse Grune (8 feet under water) is distant rather more than 3 miles N.W. by N. from the Herpin. Vessels will go northward of it by bringing Granville church open north of the lighthouse, bearing East; southward of it, by bringing Mont St. Michel in line with the Herpin, bearing S.E. (easterly); and on its east side a nearer approach to it should not be made than when Cancale church is in one with Haut Bout mill, bearing S.  $\frac{1}{4}$  W.

*Basse du Nid.*—The Basse du Nid, 16 feet under water, lies  $\frac{1}{4}$  mile within the Basse Grune, and  $2\frac{1}{2}$  miles N.W. by W.  $\frac{1}{4}$  W. from the Herpin. The depth close to it on all sides is 8 fathoms.

*Rault.*—The Rault, 16 feet under water, lies more than  $1\frac{1}{2}$  miles westward of the Basse du Nid, and the same distance N. by E.  $\frac{1}{4}$  E. from Meinga point, a projection of the coast,  $3\frac{3}{4}$  miles from Grouin point.

*Rochefort.*—The Rochefort (34 feet high at low water of high springs, and showing itself at  $2\frac{3}{4}$  hours' ebb) lies  $1\frac{1}{2}$  miles N.W. from point Meinga. The Herpin twice its breadth open northward of this rock leads outside all the dangers immediately off the shore westward of it, and also of those fronting the approach to St. Malo, including the Vieux bank, still further westward. The Rochefort is now distinguished by a stone beacon, painted *red* and *black* in bands.

**ST. MALO.**—The small island of Cézembre, in front of the entrance to this port,

\* A lighthouse, to be erected on the Grand Herpin, has been spoken of.

is nearly 10 miles S.E. by E.  $\frac{3}{4}$  E. from cape Frehel lighthouse, and 15 miles W.S.W.  $\frac{1}{3}$  S. from the light on Chausey island.

St. Malo is very difficult of access, being encumbered by shelves of sand and rock, most of which are dry at low water. The principal passages among these are—Bigne passage from eastward, Conchée passage from northward, Grande Porte and Petite Porte from north-westward, and Décollé passage from westward. There is water enough even at low tide through the Chenal de la Grande Porte, and also at the anchorages off the town, for almost the largest vessels, but the limits of the channel are confined, and the navigation made difficult by many detached dangers, so that the aid of a pilot is indispensable to a stranger. The rise of the tide here, as in other parts of the neighbouring coast, is immense; that of springs being as much as 42 feet at the equinoxes,—but their range does not average more than 35 feet; that of neaps is 26 feet, with a range of not more than 17 feet. It is high water on the days of full and change of the moon at 6h. 5m.

**Lights.**—The *fixed* light shown from the mole-head (Mole des Noirs) on the west side of the outer harbour, is at about 33 feet above high water, and visible 10 miles in clear weather.

(1) A stone tower on the south end of the islet Grand Jardin exhibits a *fixed* light (with *red* and *green* flashes of about 2 seconds' duration each, alternately, every 20 seconds) at 65 feet above the sea, visible 12 miles. The intensity of the white light appears considerably reduced when viewed from southward between the points Décollé and Dinard (between the bearings S.W. by W. and S. by E.  $\frac{1}{2}$  E. from it).

(2) A *fixed red* light is shown from a stone lighthouse (painted white at the base, black at the summit) at Roche Bonne, eastward of St. Malo port, and northward of the village of St. Hydeuc. It is distant from the light on Grand Jardin rather more than  $4\frac{1}{10}$  miles in an E. by S.  $\frac{3}{4}$  S. direction, is 128 feet above the sea, and visible from a distance of about 15 miles. The arc illuminated is  $10^\circ$  (W. by N.  $\frac{1}{4}$  N. to N.W. by W.  $\frac{7}{8}$  W.), so that it shows about  $5^\circ$  on each side of the line of the light in one with that on Grand Jardin.

(3) A *fixed green* light is shown from the upper story of a house at the head of Sablons bay. It is 41 feet above the sea, shown over an arc of  $20^\circ$  (N.N.W. to N.W.  $\frac{1}{3}$  N.), and can be seen from a distance of about 7 miles.

(4) A *fixed green* light is shown from a lighthouse on the heights of Ballue; at about  $\frac{9}{10}$  of a mile S.S.E.  $\frac{3}{4}$  E. from Sablons light. It is shown over an arc of  $16^\circ$  (N.N.W. to N.W.  $\frac{1}{2}$  N.), is 221 feet above the sea, and can be seen from a distance of about 9 miles. The tower is square, 110 feet high, and painted black at the upper part.

To enter St. Malo at night the lights 1 and 2 should be brought exactly in line, bearing E. by S.  $\frac{3}{4}$  S. and kept so until the green lights 3 and 4 are in one, bearing S.S.E.  $\frac{3}{4}$  E.; the latter lights then lead in till abreast the white light on Noirs mole. Ballue light will be lost to view behind the buildings of St. Servan, when about abreast the clock tower of St. Malo, but at that point there can be no uncertainty or difficulty in entering the port.

**Directions.**—*Bigne Passage* is so named from the rock of that name, which lies three-quarters of a mile north-eastward of La Varde point (a headland  $2\frac{1}{4}$  miles W.  $\frac{1}{3}$  S. from Meinga point) and is always very high above the water. When entering this passage, bring the great church of St. Malo in one with the Bigne S.W.  $\frac{3}{4}$  W., and run in on the eastern side of the Rochefort rock, till within three cables of the Bigne; then edge away southward, so as to round the latter rock at  $1\frac{1}{2}$  cables in order to avoid the Petite Bigne; this distance will be further regulated by the south-eastern



side of Grand Bey island being brought in one with the north-western bluff of La Varde point, but not shut in with it; then steer so as to bring Jeannet mill to touch the southern side of St. Enogat church, W.S.W. The latter mark will lead clear of all danger as far in as Petit Bey fort, and over the Banc de Bey; it is necessary, however, to open the said mill northward of the church when passing Dodehal rock, upon which there is a pole, and again to bring it on as before, when you have passed it, in order to avoid the Crapauds du Bey (guarded on the south side by a buoy).<sup>\*</sup> Having rounded Petit Bey fort, haul southward for St. Malo road, and bring-to where convenient. This route is over a part of the Bey bank that dries at low springs.

*Passe des Petits Pointus.*—This channel is westward of that of the Bigne, its entrance being between the Grands Pointus (some rocks 53 feet high at low water), and the little rock St. Servantine (a rock 2 feet above the surface at the same period of tide) which is guarded on its north side by a *red* buoy. To run in, bring Petit Bey fort open a little eastward of the coast-guard station at point Dinard, bearing S.W., and steer with that mark on until Jeannet mill opens a little northward of St. Enogat church (when it will be on with the fall of the high land that terminates the eastern side of Etetes bay), bearing W.S.W.  $\frac{1}{3}$  S., when the latter course must be followed—it will lead over the Bey bank and close to the north side of the Crapauds du Bey—until Sablons and Ballue lighthouses come in one, bearing S.S.E.  $\frac{3}{4}$  E. The last-mentioned mark will lead to the roadstead of St. Malo.

*Passe de la Grande Conchée.*—Approaching this passage, or that of Petite Conchée from eastward, be careful to avoid the St. Servantine rock, which, as already observed, is guarded by a *red* buoy; this rock is a formidable danger, as it is very steep, the depth close to it being 7 fathoms,—from it La Varde point bears S.S.E.  $\frac{2}{3}$  E. distant  $1\frac{4}{10}$  miles.

This channel derives its name from a huge rock, with a battery on it, a mile eastward of Cézembre island. When entering from northward sail in with Petit Bey fort open a little eastward of Roche mill, bearing S.S.W.  $\frac{1}{3}$  W.,—it will lead through the channel in the deepest water, but close to the east side of the Roches aux Anglais,—until the marks for crossing Bey bank come on, when proceed as before.

*Passe de la Petite Conchée.*—This channel (between the Grande and Petite Conchée rocks) is also confined and obstructed by dangers. The leading mark through it is the western part of Petit Bey fort, seen between the citadel of the city and the small fort on point Béchard immediately south-westward of it, S.  $\frac{1}{4}$  W., which carries close to the eastern side of the Crapauds du Bey; when Jeannet mill is just open southward of St. Enogat church proceed as before.

*Grande and Petite Porte Channels.*—The Grande and Petite Porte are the only navigable channels into St. Malo at low water. They both lie south-westward of Cézembre, and are divided by the rocks known by the name of Pierres de la Porte, but they both unite between the Jardins and the Pierres de la Savatte on the eastern rock of which (La Vache) is a beacon. When entering the channel of Petite Porte, steer in with the west end of Cézembre island in one with the centre of the town of St. Malo, S.S.E.  $\frac{3}{4}$  E., until within 2 miles of the island, when steer southward, to bring the southern corner of the roof of the Caserne at St. Servan in sight northward of the north-east angle of the fortification on La Cité (a remarkable tree will at the same time appear in the opening); this mark will lead between the Pierres de la Porte (on which there

<sup>\*</sup> This line of bearing leads over the Petit Dodehal, a rock 3 feet in height at low water, lying  $2\frac{1}{2}$  cables from the Dodehal in a W. by S.  $\frac{1}{2}$  S. direction.

is a beacon), and the Hupée between the Jardins and the Traversaine, and thence all the way up to the road of St. Malo, between the Buron and the Clefs des Ouvras, in not less than 24 feet at low water.

Two rocky patches have been discovered, one north-eastward of the Pierres des Portes, and another south-eastward, and both somewhat encroaching on the fairway; the depth on them is only 14 and 12 feet respectively; but these depths increase to 19 and 17 feet at one-quarter flood, and to 34 and 32 feet at half-flood,—so that the leading mark remains available at tide time, nor is it possible to find one more distinct, so continuous or so easy of comprehension to a stranger. A red beacon stands on the Buron and a buoy guards the Basse du Buron, on the opposite side of the channel. The above line of direction, however, borrows somewhat close to the Pierres de la Porte on the one hand, and to the beacon on the Jardins on the other; vessels should, therefore, open and shut those objects in a trifling degree as they pass these rocks, but not give a greater latitude than half a cable either way. Vessels will be eastward of the Traversaine, when the mill of St. Lunaire comes within its own length of Haumet; the depth on this bank is only 3 feet at low tide.

If intending to enter St. Malo by the passage of Grande Porte, bring the steeple of St. Enogat church in one with the eastern side of Haumet, and run in with this mark, until the two windmills of Petite Parame are in one with the southern angle of the fortifications upon fort Royal; this will lead southward of the Pierres de la Porte (though close), having passed which bring the southern corner of the roof of the Caserne in St. Servan in sight northward of the fortification on La Cité, as before. No square-rigged vessel of burthen should attempt these channels without a free wind.

*Passage du Décollé.*—This passage lies close along the southern shore, between Décollé point and that of Dinard. Its western entrance is between Décollé point and the Mouillère rock, on which there is a beacon; the breadth of this entrance at low water does not exceed 50 fathoms. To make use of this channel some local assistance must be obtained, for the best instructions given to a stranger would be confusing rather than otherwise, owing to the intricacy of the navigation, and the consequent changing of leading marks, which could only be taken up by a person acquainted with their position.

**Anchorage.**—There are two rocks in the roadstead of St. Malo—namely, Basse Broutard and the Plateau de la Rance: upon the former the depth is 7 feet—the latter shows at low water. The best anchorage is between these rocks and the town upon the following marks:—Grande Conchée in sight westward of Petit Bey fort, and fort Royal appearing between Grand Bey island and the garrison of St. Malo: here there is never less water than 30 feet.

The marks for the best anchorage in the roadstead of Dinard are as follows:—Grand Larron semaphore in one with Solidor tower, and the mill of Champfleuri just in sight. The roadstead of Dinard is preferable to that of St. Malo, being sheltered from almost all winds; it is consequently the general rendezvous of ships of war. The roadstead of Solidor lies immediately before the town of St. Servan, within the Solidor bank; the water here is shallow, and vessels take the ground occasionally—the greatest depth is 18 feet at low water. To run into Solidor bring the tower of Grand Larron in one with that of Solidor, and these objects will lead between point Béchard and Solidor bank; when within the latter select a berth, and anchor as convenient.

**EHBIENS.**—The anchorage at this place, about 6 miles westward of St. Malo, is between Agot island and Ehbiens island, upon which there is a massive tower. Here vessels drawing 10 feet may anchor in 5 to 3 fathoms in perfect safety. To run into the harbour, bring St. Guildo mill just in sight westward of the guardhouse on point Chevet, and hauling close round the south-east point of the island, give the island

and rocks a berth of  $1\frac{1}{2}$  cables and anchor, or run upon the beach under the watch-tower.

**DANGERS BETWEEN ST. MALO AND CAPE FREHEL.**—The outermost of the rocks and shoals at the entrance to St. Malo, and also the Vieux bank, may be cleared (as before stated) by keeping Herpin rock twice its breadth open northward of Rochefort rock, about E. by S.  $\frac{3}{4}$  S. If bound to Ehbiens, the westernmost of them will be avoided by following the mark already given; or if bound northward (to round the west end of the Minquiers) St. Malo church in line with the east end of Cézembre island, S.S.E., will lead eastward and northward of Vieux bank and the Basse des Sauvages ( $4\frac{1}{2}$  fathoms), the outermost of the dangers hereabout, except the Basse Trouvée.

*Basse Trouvée.*—The Trouvée is a rocky ledge, nearly 8 miles northward of Cézembre island, from which the point of the citadel at St. Malo appears just open westward of the Grande Conchée, bearing S.  $\frac{3}{4}$  W., and the mill of Tertre Morgan is just open southward of fort La Latte, S.W. by W.  $\frac{1}{2}$  W. The depth over it is 14 feet, and there is deep water (14 to 15 fathoms) close-to all round it.

*Basse des Sauvages.*—The two little patches known collectively as the Basse des Sauvages are distant 6 miles N.E.  $\frac{1}{4}$  E. from fort La Latte. The depth on them is never less than 25 and 28 feet. The marks for them are, the point of La Vicomte in sight eastward of the point next southward of La Latte, S.W.  $\frac{3}{4}$  W., and St. Malo church just seen eastward of the hut on Cézembre island, S.S.E. The same church on with the east end of Cézembre clears them on the east side.

*Vieux Banc.*—The Vieux, a rocky ledge 4 miles N.W. from Cézembre island, has its southern part dry at low water. The marks for it are, St. Ideuc church midway between Petite Conchée and Cézembre, S.E.  $\frac{2}{3}$  E., and St. Guildo windmill just open westward of Oeillere isle, S.W.  $\frac{2}{3}$  S. Parame church in sight northward of Petite Conchée, S.E.  $\frac{1}{4}$  S., leads northward of the Vieux bank; the same church in sight southward of Petite Cézembre, S.E.  $\frac{3}{4}$  E., carries southward of it; the mill of St. Guildo in one with the western part of Ehbiens isle, S.W., will lead eastward of it; and the mill of St. Jacut in one with the eastern part of the island, S.S.W.  $\frac{1}{2}$  W., will carry westward of it. This shoal generally betrays itself by rippings.

At about half a mile north-eastward from the Vieux bank, there is a small spot with only  $3\frac{3}{4}$  fathoms over it at low water.

*Banchenou Ledge.*—The Banchenou lies about 2 miles south-west from the Vieux bank, and directly in the fairway from St. Malo to cape Frehel. The sea breaks over it occasionally, although the depth over it is never less than 15 to 20 feet. St. Jacut mill in one with Ehbiens tower leads over its shoalest part; and it will be avoided by opening the said mill proportionally eastward or westward of the island.

*Bourdinots.*—The Bourdinots lie about a mile east of the point of St. Cast, and appear at low water. The Grande Conchée well open northward of Cézembre island, or the mill of Tertre Morgan in sight northward of St. Cast peninsula, leads northward of them.

*Basse Catis.*—The Catis shoal, a patch of  $4\frac{1}{4}$  fathoms, lies  $2\frac{3}{4}$  miles N.E.  $\frac{3}{4}$  E. from fort La Latte. From it, the point of La Vicomte appears in sight eastward of the point next southward of that of La Latte, S.W.  $\frac{3}{4}$  W., and cape Erqui is a little open southward of the Amas de Frehel, west. Vessels will pass southward of it by shutting in cape Erqui with cape Frehel; and northward of it by opening cape Erqui a sail's breadth northward of the Amas de Frehel.

**FRENAY BAY**, about 2 miles eastward of cape Frehel (between the castle of La Latte and point St. Cast), affords very good shelter against off-shore winds, and contains excellent holding-ground. It may be entered in safety at all hours, the only



precaution necessary when anchoring, is to make allowance for the fall of the tide. Its northern shore is clear of outlying dangers; its southern shore has some rocks extending from it, and a patch of 10 feet water lies half a mile northward of the extremity of point St. Cast.

In the bay between fort La Latte and cape Frehel there are numerous rocky patches, which with the rock and bank of l'Etendrée, considerably obstruct its free use as a place of shelter for a stranger. L'Etendrée rock is nearly due East from the lighthouse, and shows at 4 hours' ebb; from it a shallow bank of the same name extends three-quarters of a mile south-eastward. No sea-going vessels should approach the shores of this bay within a mile; fishing vessels assemble here occasionally in great numbers.

**Cape Frehel Light.**—Cape Frehel, a high steep headland about 12 miles N.W. by W. from St. Malo, is distinguished by an octagonal lighthouse 72 feet high, from which, at an elevation of 259 feet above high water, is exhibited a *revolving* light (attaining its greatest brilliancy every *thirty seconds*), visible about 22 miles—the eclipses in ordinary weather do not appear total within the distance of 12 miles.

A short distance north-westward from cape Frehel lighthouse there is a high rock known as the Amas du Cap, which is a very conspicuous object from all directions seaward. In the narrow channel between it and the sunken rocks in the vicinity of the lighthouse, the depth is 5 fathoms.

**ST. BRIEUC BAY.**—The bearing and distance from cape Frehel to the north end of Brehat island are N.W.,  $28\frac{1}{2}$  miles; the coast between bends inwards and forms a deep bay named St. Brieu, in which there is a considerable depth of water, but so many rocks are scattered about it in all directions, that none but coasters, and those well acquainted with the navigation, ought to frequent it. The outermost, and consequently the most dangerous to vessels passing, are the Grande and Petite Livière, a shallow spot off cape Erqui, Grand and Petit Léjon, the Bancs de Sable, and the Horaine and adjacent banks,—all these are within the depth of 18 fathoms; hence a vessel by keeping without that depth at low water will pass safely outside them. Besides these, however, there are the Maurice bank, and the Barnouic and Douvres rocks, at a considerable distance north-eastward of Brehat island, of each of which we shall give a short description in their proper order.

*Grande Livière.*—The Grande Livière (a patch 14 feet under the surface at low water) lies 3 miles N.W.  $\frac{1}{2}$  W. from cape Frehel lighthouse, so that by keeping that building southward of S.E.  $\frac{1}{2}$  S. vessels will go northward and eastward of it.

The *Petite Livière*, three-quarters of a mile S.S.W.  $\frac{1}{2}$  W. from the Grande Livière, has only  $1\frac{1}{2}$  fathoms water over it when the tide is down.

*Pierre du Banc.*—About  $1\frac{3}{4}$  miles north-westward from the Pourier rocks,  $8\frac{3}{4}$  miles N.W. by W.  $\frac{1}{2}$  W. from cape Frehel light, and  $3\frac{3}{4}$  miles N.  $\frac{3}{4}$  W. from cape Erqui, is the Pierre du Banc, a small patch on which the depth is not more than  $2\frac{3}{4}$  fathoms at low water. There are several other sunken patches within it, and also some rocks which uncover, but this is the northernmost, and the only one necessary to notice.

*Grand and Petit Léjon.*—These dry respectively 22 and 9 feet above the surface at low spring tides. The Grand Léjon is marked by a beacon, and from it a shallow bank runs north-eastward fully two-thirds of a mile;—it lies just within the line of bearing between cape Frehel and Brehat island, and equidistant from both. From Harbour island light (one of the St. Quay rocks) it bears E. by N.  $\frac{3}{4}$  N., distant  $7\frac{1}{2}$  miles, and from cape Frehel nearly N.W.  $\frac{1}{2}$  W.  $14\frac{1}{4}$  miles.

About three-quarters of a mile S. by E. from the Grand Léjon there is a small

bank of  $2\frac{1}{2}$  fathoms known as the South-east bank, which must be carefully guarded against when sailing southward of that rock, as the depth close to it on all sides is 12 fathoms.

The Petit Léjon,  $3\frac{1}{2}$  miles S.  $\frac{3}{4}$  E. from the Grand Léjon, is surrounded by shoal water, particularly on its northern and eastern sides.

**Brehat Islands, &c.**—The isles of Brehat (low and covering a space of  $3\frac{3}{4}$  miles in length by  $1\frac{1}{2}$  miles in breadth, where broadest) are surrounded by innumerable rocks and rocky patches, particularly on their north-east, east, and south-east sides, in which last direction they extend out to the distance of 8 miles from the islands, and  $6\frac{1}{2}$  miles from the nearest mainland. There is a small roadstead at Brehat, used by coasters and the small craft of the natives, but none unacquainted with the place should think of going there, as the various channels leading to it are narrow and intricate, and no marks can be given capable of being taken up by a stranger.

**Lights.**—On the summit of Paon rock, the north-east extremity of Brehat island, there is a *fixed red* light, at 67 feet above high water, visible from all parts of the horizon at a distance of 6 miles. A *red fixed* light is also shown from a turret on the platform of Rosédo, on the east side of Brehat harbour: it illuminates an arc of  $20^\circ$ , is 90 feet above the sea, and visible 8 miles.

**Horaine Rock.**—The Horaine, distant more than three miles E. by N. from the north-east end of Brehat island, is marked by a beacon, which bears from Brehat signal station N.  $42^\circ$  E., distant  $4\frac{1}{2}$  miles,—its summit is 23 feet above low water. Above half a mile north-eastward of it is the Banc du Nord, on which the depth is  $1\frac{3}{4}$  to  $3\frac{1}{2}$  fathoms; and to the S.E. by E.  $\frac{1}{2}$  E.,  $1\frac{1}{4}$  miles, lies the *Banc du Sud-est* with only 8 feet water on it at low water; between this latter and the shoal extending from the Horaine there is a narrow channel  $4\frac{1}{4}$  to 10 fathoms deep, which can be used by those having a local knowledge. On account of these banks the Horaine should have a berth of at least  $1\frac{3}{4}$  miles, or not be approached nearer than into 20 or 18 fathoms.

**Bancs de Sable.**—The Bancs de Sable consist of several isolated patches from 14 to 30 feet under the surface at low water. Their northern extremity is  $4\frac{3}{4}$  miles E. by S. from the north-east end of Brehat island, whence they extend southward a distance of 5 miles, their southern extremity being nearly 8 miles S.E.  $\frac{3}{4}$  E. from the south end of that island. They should not be approached nearer than the depth of 18 fathoms, as they are very steep in many places. Between them and the land there are innumerable rocks and shoals, among which are narrow but deep channels used by the coasters in sailing to or from Brehat road.

In St. Brieuc bay are several places frequented by coasters and other small vessels. The most important are Erqui, on the south-eastern side of the bay; Légue, in the southern part, Binic, Portrieux, and St. Quay, on the south-western shore; and Paimpol, in the western part. Strangers bound to these places must have the assistance of a pilot.

**Erqui.**—Erqui bay, immediately southward of cape Erqui, is small, circular in form, and about half a mile in extent, and dries at low water to a short distance outside its extreme points. Fronting it is the roadstead, where vessels are partially sheltered by the cape and numerous outlying rocks; the depth decreases pretty gradually from 5 fathoms to low water mark, on sand, and sand and mud.

**Légue.**—Le Légue is at the head of St. Brieuc bay, on a small river which empties into a large and shallow bay, named Yffiniac, the strand of which is at times 12 and 15 feet above the sea at low water; consequently the river can be entered only by very small craft. On the northern side of the entrance, on Aigle point, is a circular light-house, whence at an elevation of 45 feet above high water is exhibited a *fixed* light, visible in clear weather at the distance of 10 miles.

**St. Quay.**—The Rocks of St. Quay (a considerable group, of which some are above water) are so steep that they should be very carefully approached. The narrow and shallow channel within them leading to the ports of St. Quay, Portrieux, and Binic, is not sufficiently clear of danger to be entered by strangers, or by vessels of even moderate draught. On one of the northern rocks, known as Harbour island, is a small *fixed* light, 49 feet above high water, and, therefore, visible at the distance of 10 miles in clear weather.

**Binic.**—Port Binic is south-westward of St. Quay rocks, and here there is also a *fixed* light, shown at 36 feet above high water, and visible 10 miles. This little harbour is dry at low water, the beach at that time being uncovered to the distance of  $1\frac{1}{4}$  miles from the head of the bay. The range of the tide is not quite so great as at Erqui, that of springs being only 30 feet and neaps 15. There are two passages to Binic, one between the rocks of St. Quay and the main, and the other eastward and southward of those rocks; the latter is the safer on account of its depth and extent. The anchorage off the port is at the distance of from 2 to 3 miles in an E. by S. direction; the depth is  $2\frac{1}{2}$  to 4 fathoms on mud and sand.

**Portrieux.**—Portrieux lies behind the St. Quay rocks, which afford considerable shelter to its roadstead from north-easterly, easterly, and south-easterly winds. Like the previous places, it is small and dry at low water; springs, however, range as much as 31, and neaps 16 feet. A *fixed red* light, visible 7 miles, is shown here, 49 feet within the head of the pier.

The little port of St. Quay is half a mile northward of Portrieux, and, like that place, its approaches are encumbered with many rocks.

**Paimpol.**—Paimpol, at the head of the shallow and rocky bay of that name, is situated immediately southward of Brehat islands. The channels to this place are extremely intricate, and among a host of sunken dangers, so that it is only visited by the native craft.

**DOUVRES ROCKS.**—The Plateau des Roches Douvres lies between latitudes  $49^{\circ} 4' 45''$  and  $49^{\circ} 7' 45''$  N., and (including the shallow spots surrounding them) occupies a space of nearly 4 miles in length by  $2\frac{1}{2}$  miles in breadth; it extends in a N.N.W. and S.S.E. direction, and its centre bears from the Corbière (Jersey) about W. by N.,  $22\frac{1}{2}$  miles; from cape Frehel lighthouse N. by W.  $\frac{1}{2}$  W., 32 miles; from point Plemont (Guernsey) S.W.  $\frac{1}{2}$  S., 20 miles; and from the north-east end of Brehat island N.E., nearly 16 miles. At low water nearly a hundred heads of rocks are visible, but at high water only twelve can be seen; the highest of these, near the middle, is then very little above the sea,—at low water it is above 48 feet high.

During westerly gales, vessels may ride eastward of the Douvres rocks, at about a mile off, in 30 fathoms, as the force of the sea will be considerably broken by them; care, however, must be taken to avoid the outlying sunken heads. Small French craft frequently anchor among the rocks in smooth water, and in summer Jersey and French fishing boats are generally to be met with in their vicinity; from these, if necessary, a guide may be obtained to conduct a vessel to her destination. During night, or in thick weather, vessels ought not to approach them nearer than into 40 fathoms, the depth almost immediately off them being 30 and 32 to 35 fathoms.

**Light.**—An iron lighthouse (painted white) has been erected on one of the Douvres rocks in lat.  $49^{\circ} 6' 28''$  N., long.  $2^{\circ} 48' 54''$  W. It shows, at an elevation of 60 feet above high water, a *flashing* light, said to be visible in clear weather from a distance of 25 miles.

**BARNOUIC ROCKS.**—About  $2\frac{3}{4}$  miles S.S.W. from the Douvres rocks, and  $12\frac{1}{2}$  miles E. by N. from the lighthouse on Les Heaux, is the bank of Barnouic, which trends N.W. by W. and S.E. by E. about  $3\frac{3}{4}$  miles, and is steep, the depth almost



close to it being 19 to 25 fathoms. Upon it are the Gautier and Barnouic rocks, respectively 13 and 22 feet above low water,—with many others about them, 3 and 6 feet under the surface. The Basse du Moulec, which may be considered the northern extremity of this bank, has only 12 feet water upon it; it lies N.W. by N.  $1\frac{5}{8}$  miles from the Barnouic rock. The channel between the Douvres and the Barnouic bank is contracted in width by the Basse du Moulec to 2 miles.

**Basse Maurice.**—This is a sunken rock on which the depth is not less than 7 fathoms at low water; consequently it is not dangerous, although the sea breaks over it at times with considerable violence. It lies midway between Barnouic rock and Les Heaux lighthouse, at about  $6\frac{3}{4}$  miles E.  $\frac{1}{4}$  N. from the latter, and 4 miles N. by E.  $\frac{1}{3}$  E. from the beacon on Horaine rock.

Mr. BEAUTEMPS BEAUPRÉ says, “The best channel northward of Brehat island appears to be that which is bounded on the south by the Heaux, Roch-ar-bel, Horaine, and adjacent banks; and on the north, by the Barnouic and Gautier rocks. It is 7 miles wide, and the flood and ebb tides follow its direction. A vessel should, if possible, avoid the channel between the Douvres and Gautier and Barnouic rocks.”

**PONTRIEUX RIVER.**—This river leads to the village of Lezardrieux. The entrance is between Horaine reef and the Brehat islands, on the east side: and Roch-ar-bel and St. Mode island and rocks, on the west-side,—the former of these we have already alluded to. Roch-ar-bel (3 to  $3\frac{1}{2}$  fathoms under water) is the north-east extremity of the great flat that extends from the shore, and separates Pontrieux and Treguier rivers, and of which the Heaux forms a part; it bears from the Horaine beacon N.W. by N.,  $3\frac{1}{2}$  miles, and from the Heaux lighthouse E.  $\frac{3}{4}$  S.  $3\frac{3}{8}$  miles.

The depth in Pontrieux river decreases from 18 and 12 fathoms at the entrance to 4 fathoms in the vicinity of Lezardrieux, and the channel in some parts is not  $1\frac{1}{2}$  cables wide; the bottom is very irregular, as the lead will drop sometimes into 10 fathoms, and then immediately after into 5 or 6 fathoms. The outermost dangers on each side are nearly all marked by beacons or poles. On account of the numerous steep rocks at its mouth, strangers intending to enter must obtain local assistance, if possible; if unable (which is extremely improbable) run in with Bodic tower (on the western shore) in one with the pyramid on Croix rock (at the western part of the Brehats) bearing W.S.W.; and when a quarter of a mile from the pyramid, steer out into the middle of the river to pass in mid-channel between it and a beacon on a rock opposite it, named Moguedhier. Having passed this rock, bring the tower well open eastward of the custom-house on the Roch-ar-en on the same bearing as before, and when abreast of the latter proceed further up by keeping in the fairway of the river. It is high water here at 5h. 53m. on the days of full and change. The mean range of springs is 31 feet; of neaps 16 feet.

**Lights.**—The following lights have been established at the entrance to Pontrieux river.

**Croix Rock.**—The tower on this rock is 52 feet high, and shows a *flashing* light at 45 feet above the sea, visible 10 miles. The eclipse and flash each continues 4 seconds. The rock is on the east side of the channel, in front of three islets, and the geographical position of the tower is lat.  $48^{\circ} 50' 18''$  N., long.  $3^{\circ} 3' 24''$  W. The light is shown over an arc of  $24^{\circ}$  (or  $12^{\circ}$  on each side of the centre of the channel).

**Bodic Tower.**—This light is similar to that on the Croix rock. The tower is 55 feet high, on the west side of the channel (on the heights of Bodic), at rather more than 2 miles south-westward from that of the Croix rock; and its geographical position is lat.  $48^{\circ} 48' 45''$  N., long.  $3^{\circ} 5' 30''$  W. The light is 176 feet above the sea, and visible from the distance of about 12 miles. The arc illuminated is  $18^{\circ}$  (or  $9^{\circ}$  on each side of the centre of the channel).

There are also two *red* lights on the left side of the river to guide from the Croix rock to the inner anchorage. They are distant from each other 722 yards S.W. by W.  $\frac{1}{3}$  W., the outer one being 39 and the inner 150 feet above high water.

In reference to these lights, vessels entering the river must keep the flashing lights on Croix rock and Bodic heights in line, and when near the first named, keep a little to the south-westward, in order to get the two red lights in line, which so kept will lead to the anchorage of Coat-Mer.

The west side of the channel into the river is now marked by a bell-buoy on the Plateau des Sirlots, and by five stone towers painted *red*.

**TREGUIER RIVER** has two entrances among the group of rocks that lines the shore. One is between Roch-ar-bel (and the extensive rocky flat within it) and the Heaux, and the other is about  $4\frac{1}{2}$  miles westward of the Heaux; the former is known as the Passe de la Gaine, and the latter the Grande Passe. Both these entrances are so much encumbered with rocks that no one unacquainted with the locality should use them, unless with a pilot's assistance. The leading mark for entering the Passe de la Gaine is the Grande Maison (Large House) north-eastward of Plougrescan church, open northward of Tourot mill, W.  $\frac{2}{3}$  S., but the channel though deep is exceedingly narrow, being in some places not much over half a cable wide. For the Grande Passe, which is more capacious than that of La Gaine, the leading mark is two mills (St. Antoine and that of Port de la Chaîne) in one, bearing about S.S.E.

The town of Treguiér is about 10 miles up the river from the Heaux lighthouse. Here it is high water at 5h. 32m. on full and change days, and the range of springs is 25 feet, and of neaps 12; but at the Heaux it is nearly a quarter of an hour later—the average rise of springs at the latter place is 31 feet, and of neaps 16.

**Lights.**—To vessels approaching Treguiér river the light on the Heaux rock affords an excellent guide. This light is *fixed*, shown from an elevation of 148 feet, and in clear weather is visible from a distance of 18 miles.

On the coast behind the Heaux lighthouse are two small *fixed* lights, one *white* and the other *red*. When in line bearing S.S.E. they lead through the Grand Passe.

From the rocks fronting Treguiér river to the Sept (Seven) islands there is no place of importance. The coast throughout has islets, rocks, and rocky patches in vast numbers lying off it, some as far out as 3 miles.

**PERROS BAY.**—Perros bay, southward of the Sept islands, has two entrances, one on each side of Tomé island. The port in the south-west corner of the bay is dry at low water, and visited only by small vessels, which must be under the guidance of some one having local knowledge, the approaches being encumbered with shoals and rocks.

**Lights.**—To assist vessels in entering the bay the following lights have been established:—A *fixed* light on the south-east shore, near the bridge of Nantouar, 33 feet high, and visible 10 miles; and another *fixed* light 750 yards south-eastward of the above light, on a turret built near the farm of Kerjean, 253 feet high, and visible 14 miles. These two lights in line lead through the channel westward of Tomé island.

A *fixed* light on the south-western shore, 328 yards behind the Pigeon house (which serves as a day-mark); this light is 89 feet above the sea, and visible at the distance of 12 miles. A *fixed* light near the mill of Kerprigent, 3133 yards south-westward from the Pigeon house, elevated 259 feet, and visible 14 miles. These two lights in line indicate the direction of the passage eastward of Tomé island.

Vessels entering the port of Perros by the Passe de l'Ouest should leave the line of direction of the two first-named lights a little before the two latter come in sight. The Pigeon house and Kerprigent lights then lead in.

On the rock Mean Ruz ( $2\frac{1}{2}$  miles southward of Sept islands' lighthouse, and on the

east side of the entrance to the little port Ploumanac'h) there is a *fixed red* light, 69 feet high, and visible 5 miles high.

**SEPT (SEVEN) ISLANDS.**—The Sept islands, including the covered and uncovered rocks among and around them, occupy a space of 5 miles in length from E. by S. to W. by N., and 2 miles in width. They are named Bono (the largest), Moines (on which is a lighthouse), Rougie, Plate, Malban, Costan, and Cerf. The lighthouse on the eastern end of Moines is 52 feet high, and shows a *fixed* light (*flashing every 3 minutes*) at 184 feet above high water level, visible 15 miles;—in ordinary weather the eclipses do not appear total within the distance of 6 miles. When Rougie island and the east end of Bono island come between the observer and the lighthouse, the light is obscured; these islets lie between the bearings of E. by N. and E.  $\frac{1}{4}$  S. from it, at the distances of half a mile and  $2\frac{1}{2}$  miles. The bearing and distance from this light to that on the Heaux is almost E. by S.  $\frac{1}{2}$  S., 16 miles.

Vessels running along the coast should not approach the northern side of the Sept islands nearer than the depth of 40 fathoms. If passing through the channel between the islands and the land keep in mid-channel, and give Tomé island a berth of at least  $1\frac{1}{2}$  miles. The land south-westward of the islands, in the vicinity of Grande and Losquet islands, should not be approached nearer than  $1\frac{1}{2}$  miles.

**PLATEAU DES TRIAGOZ.**—The eastern extremity of this dangerous group of rocks lies N.W. by W.  $\frac{1}{2}$  W.,  $5\frac{1}{4}$  miles from Sept islands lighthouse; thence the group extends W.  $\frac{1}{2}$  S.  $2\frac{3}{4}$  miles, and W. by N.  $\frac{1}{2}$  N. (with deep and wide channels intervening) a distance of  $4\frac{1}{2}$  miles. The western part terminates with two sunken rocks of 14 and 35 feet water respectively, named Fouillie and Petite Fouillie. The passages over the bank are available only to those familiar with them.

*Light.*—A stone lighthouse on the south-east side of the Plateau des Triagoz shows at an elevation of 98 feet above high water, a *fixed* light (varied by alternate *red* and *white flashes* every *half minute*) visible in clear weather at the distance of 12 miles.

Although the danger from this extensive plateau has been much lessened since the establishment of the light, shipmasters must be cautious how they approach the coast hereabout, and be careful not to steer southward of East, or E. by N., until they have the Triagoz reefs on the starboard side, for the current sets strongly to the S.E. upon the Triagoz and also upon the Sept islands. During day, and in clear weather, most of the rocks are visible; hence the sunken dangers by which these visible rocks are encompassed can then be generally avoided.

**PLATEAU DE LA MELOINE.**—The Plateau de la Méloine commences 5 miles south-westward of the lighthouse on the Plateau des Triagoz, extends 5 miles in an E.N.E. and W.S.W. direction, and is  $1\frac{1}{2}$  miles across. The principal rocks upon it are the Pongaro, Méloine, and Trépieds. The *Pongaro* lies on its north-eastern part, is awash at low water, and eastward from it, to the distance of about a mile are some patches 11 to 12 feet under the surface. The *Méloine* is in about the centre of the bank; and the Trépieds are upon its western extremity. The last consists of many heads, some of which are always covered, and are, consequently, very dangerous, particularly as the water close to them is deep; from them the lighthouse on the Ile de Bas bears W. by N.  $\frac{1}{2}$  N., distant  $7\frac{1}{4}$  miles. By keeping that lighthouse northward of W.N.W. vessels will pass southward of Brien bank (the southernmost spot on the Méloine) over which the depth is 4 fathoms at low water.

The channel between the Méloine and Triagoz banks is 4 miles wide, and 26 to 38 and 40 fathoms deep; vessels should not, however, approach either into a less depth than 27 fathoms. Sept islands lighthouse E. by S.  $\frac{1}{2}$  S. marks the southern limits of the Plateau des Triagoz, and Bas lighthouse W.  $\frac{1}{3}$  N. the northern limits of the Plateau de la Méloine.



**LANNION BAY.**—Grande and Losquet islands are  $5\frac{1}{2}$  miles south-westward from the Sept islands, and E.  $\frac{3}{4}$  N.  $9\frac{1}{2}$  miles from Primel point, the eastern side of the entrance to Morlaix river. Between Losquet island and Primel point the coast forms a deep indentation, at the bottom of which is *Lannion River*, having a bar dry at low water. The town of Lannion, 5 miles up the river, is frequented by vessels whose draught of water will allow them to pass the bar. Those bound to this place should get the help of a pilot as soon as possible, for the whole of the bay is studded with steep insulated rocks, and many rocky ledges extend from the shore. The outermost and most dangerous of these detached rocks are the *Crapaux*, and the *Chaises de Primel*. The *Crapaux* lies W.  $\frac{2}{3}$  S. nearly 2 miles from Losquet island, and is just above the surface at low spring tides; it is surrounded by several very shallow patches, the depths on which vary from 2, 5, and 7, to 20 feet, especially on its west and south-east sides, where they are distant from it more than a half a mile. The *Chaises de Primel* lie  $1\frac{1}{2}$  miles eastward from the extremity of point Primel, and there are numerous rocks above and under water between them.

Vessels bound to Morlaix river from north-eastward will pass in safety within the Triagoz and Méloine banks, by keeping Sept islands lighthouse (as long as visible) bearing E. by N. When in the vicinity of point Primel, give it a good berth to avoid the rocks extending from it.

**MORLAIX RIVER.**—The entrance to Morlaix river is 17 miles W. by S. from the Sept islands, and 4 miles S.E. by E. from Ile de Bas. There are two channels into it, the Treguier and Grand Channel. The *Chenal de Treguier* is narrow at its inner part, being between rocks very little more than a cable apart; and here it is also very shallow, as it is over a bank of only 2 to 10 feet water at low tide. The *Grand Chenal* (though equally limited) is deeper than the other, as there is nowhere less water than 6 fathoms. Strangers cannot enter this river without a pilot; if, however, compelled by circumstances to attempt to run in, the following instructions may be useful.

In Morlaix roadstead it is high water at 4h. 53m.; the average rise at springs is 24 feet, and at neaps 18 feet,—neaps range 12 feet.

**Lights.**—Four lights have been established in Morlaix river. Of these, a *fixed* light, shown from the Tour de la Lande (on the south-western shore) at the height of 285 feet above the sea, is visible 12 miles; that on the Ile Noire (a small island in the roadstead, between the two entrance points of the river), *fixed* with *flashes* every 2 minutes, is 46 feet above high water, and visible 10 miles;—these two lights in one lead through the Treguier channel. A small *fixed red* light exhibited from the Chateau du Taureau (two-thirds of a mile north-westward from the Ile Noire), lights the anchorage in the northern part of Morlaix roadstead. And a small *fixed* light is on Louet island (on the western side of the channel); this when in line with the Tour de la Lande light leads vessels of light draught through the eastern (the shallowest) part of the Grand Chenal.

**Directions.**—Vessels from westward or northward bound to Morlaix should steer for the Ile de Bas, but should not approach it nearer than 2 miles, or into the depth of 30 fathoms.

*Treguier Channel.*—Having made the Ile de Bas, bring the extremity of point Primel to bear S.S.E. to lead between the Trépieds and Rater rocks. As soon as the leading mark for the channel comes on, which is the Ile Noire in one with the Tour de la Lande, bearing S.S.W.  $\frac{3}{4}$  W. follow that mark until Beelem island is on the star-board hand, when the vessel will be upon the edge of a shallow flat, running northward from point Barneneze, over which at low water the depth is as little as 2, 3, and 6 feet. The passage over this flat must be regulated by draft of water and time of

tide; the same leading mark, strictly adhered to, will lead over it to abreast of Ile Blanche, an islet on the port hand with a beacon upon it. It will then be necessary to alter course, so as to round the Ile Noire on its west side at a distance of one-sixth of a mile. Anchorage may be found off the starboard point of the river in 6 or 7 fathoms, opposite the Ile Noire; but it must be remembered that hereabout are several shallow spots which will require care to avoid;—this part is Morlaix roadstead. The town of Morlaix is 6 miles further up the river. At about  $2\frac{1}{2}$  miles above the roadstead the river becomes very narrow, and is almost dry at low water.

Approaching the river from eastward by the channel inside Méloine bank, all the dangers between the Sept islands and point Primel will be avoided (as already observed) by keeping the lighthouse on Moines island on an E. by N. bearing. In rounding Primel point give it a good berth, and when sufficiently westward of it to bring the Tour de la Lande and Ile Noire in one, proceed as before.

*Grand Channel.*—The Grand channel, which is much deeper than the Treguier, has its entrance from northward between Rater and Pot de Fer rocks, the former of which ( $2\frac{1}{2}$  fathoms under water) lies  $2\frac{1}{4}$  miles N.W. of point Primel, and the latter (having only 4 feet on it) is at the eastern extremity of the Duon rocks, at the distance of a mile E.  $\frac{1}{2}$  N. from the little tower erected upon those rocks, and one mile from the Rater. The leading mark for the channel is the light-tower on Louet islet (opposite Noire island) in line with the Tour de la Lande, S. by W.  $\frac{3}{4}$  W.; this will lead between the Rater and the Pot de Fer to abreast Ile Verte, on the starboard side of the channel, when the course must be altered to south-westward, so as to round Petit Ricard and Ile Ricard at the distance of a cable;—unless it is intended to go through the narrow passage between Beelem and Ricard islets, in which event it will be necessary to keep the leading-mark strictly on,\* for in some parts of this channel the width does not exceed half a cable. Having then continued on this mark till within Ile aux Dames, preserve the channel fairway by steering between the beacons placed on the rocks bounding it on each side, until up with Noire island, off which choose a berth as convenient.

If passing through the wider and deeper channel westward of Ile Ricard, carefully avoid an 11-foot spot,  $1\frac{1}{2}$  cables south-westward from that island, particularly at or near low water. With the exception of this rock there is nothing to endanger a vessel all the way to the roadstead, provided she keep between the beacons erected upon the rocks.

**ST. POL DE LEON.**—St. Pol de Leon is a small harbour immediately westward of Morlaix river. The channels to it are among rocks, and over banks which dry at low water; the beach before the harbour also dries a long way out. It is visited by coasters, the masters of which are acquainted with the navigation. Those that are not should obtain a pilot's assistance.

**ROSCOFF.**—Roscoff is another small place on the coast, under the eastern end of Ile de Bas. It is dry at low water, and the entrances are likewise encumbered with rocks and shoals.

**ILE DE BAS (Light).**—Ile de Bas is above 2 miles in length, and three-quarters of a mile in its greatest breadth: it is surrounded by rocks, and separated from the main by a narrow and intricate channel among numberless heads above and under water. The lighthouse on the western side of the island shows a *revolving* light at an elevation of 223 feet above the level of high water, so that in fine weather it can be seen at the distance of 24 miles; an eclipse occurs every minute, but is not total in

\* When using this narrow passage at low tide, care is necessary to avoid the sunken rock, Roche de l'Equinoxe, which lies one-third of a mile N. by W.  $\frac{3}{4}$  W. from Beelem islet, and two-fifths of a mile N.E.  $\frac{2}{3}$  N. from Ricard islet. The depth over it is only 7 feet, and the leading mark crosses it.

ordinary weather within the distance of 12 miles. Its geographical position is lat.  $48^{\circ} 44' 45''$  N., long.  $4^{\circ} 1' 44''$  W.

The Ile de Bas should not be approached nearer than  $1\frac{1}{2}$  miles, nor into the depth of 25 fathoms, some of the dangers on its northern side being nearly a mile from it and steep.

The tide in the vicinity of the Ile de Bas flows on the days of full and change until 4h. 49m.; in the offing it continues till  $7\frac{1}{2}$  hours. The rise of springs is 23 feet, that of neaps 17 feet,—the mean range of neaps is 11 feet.\*

**The Coast.**—The coast from Ile de Bas to Vierge island is destitute of harbours capable of accommodating anything but the smallest vessels. As these harbours are all dry at low tide and have their entrances among outlying rocks, a description of or instructions for entering them is of little service,—a pilot's assistance must always be obtained by strangers; consequently, beyond naming the principal places, such as the river Guile, Goulven, Kerlouan, Guisseney, and Corréjou, and cautioning passing shipmasters against approaching the land, especially in the immediate vicinity of the east side of Vierge island, where the Plateau d'Aman-ar-Ross, the Plateau du Guern, and the Plateau du Lizen Ven run out to the distance of 2 and  $2\frac{3}{4}$  miles, any remarks are unnecessary. During day the depth should not be decreased to less than 30 or 25 fathoms; during night to 40 or 36 fathoms. The land is high with many steeples on it, and can be seen at the distance of 15 or 18 miles.

**Pontusval Light.**—On Pontusval point, in lat.  $48^{\circ} 40' 43''$  N., long.  $4^{\circ} 20' 53''$  W., there is a lighthouse which shows a *fixed* light at 42 feet above the sea, visible 10 miles.

**Vierge Light.**—Vierge island, 22 miles westward of Bas island, is the northernmost of a group of rocks on the eastern side of the entrance to Abervrac'h. The light on this island, 108 feet above high water, is *fixed* (varied by a *red flash* every *four minutes*),—each flash is preceded and followed by a short eclipse, which does not appear total within the distance of 6 miles—and in clear weather may be seen at the distance of 15 miles. The lighthouse is 2 miles E.N.E. from the outer anchorage of Abervrac'h, and its geographical position is lat.  $48^{\circ} 38' 23''$  N., long.  $4^{\circ} 34' 11''$  W.

**ABERVRAC'H.**—There are two channels into Abervrac'h, the Chenal de la Malouine ( $1\frac{1}{2}$  miles westward from Vierge island) and the Grand Chenal (about 3 miles from it in the same direction).

In the Malouine channel the depth at low water is not less than  $3\frac{1}{2}$  fathoms. This channel is very narrow, being between rocks, in some places not a cable apart.

The Grand channel is wider and much deeper than the Malouine channel, yet there are two or three patches in the way, that prevent the leading mark being made too free with. The outer anchorage is just outside Cezon island, which will be recognised by the fort upon it.

It is high water at Cezon island at 4h. 17m. on the days of full and change; springs range 22 feet, and neaps 10.

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\* Some rocks, known under the name of Roches Blanches, have been reported, on the authority of M. DECHAMPS, to lie about 18 miles N. by E. (*true*) from the Ile de Bas. "This patch is never uncovered, the sea breaks furiously over it in storms at low water, and the foaming of the sea remains some time in sight. The Casquets bear from it N.E. by E. (*true*) distant about 27 leagues. Vessels running up Channel, and meeting with this danger, might take their departure from it, and thus steer northward of the Casquets. Some persons have asserted that there is always sufficient water over these rocks for vessels of every draught; but I doubt this, for the sea would hardly break over it with such violence if covered with deep water. It may, however, put the mariner upon his guard, when I state that I have seen the sea breaking, when, in clear weather, the Ile de Bas was perfectly in sight; my soundings were 53 fathoms, coarse sand and gravel." The existence of this patch of rocks is very much doubted. It is to be regretted that the locality assigned to it has not been examined.



*Lights.*—The navigation into Abervraç'h has recently been considerably facilitated by the establishment of a light on Ile Vraç'h, and by a lighthouse on the heights of Lanvaon. The former, a *red fixed* light, is on the north side of the entrance, and is shown from a square building painted white, to serve as a mark by day; it is 59 feet above the sea at high water, and visible about 7 miles. Lanvaon light, a *fixed* light,  $1\frac{1}{2}$  miles S.E. by E. (easterly) from Vraç'h light, is shown at an elevation of 173 feet above high water, and visible at the distance of 12 miles. Besides these two lights (which when in one lead through the Grand channel, as far as the Petit Pot de Beurre rock beacon), there are two *fixed* lights, one (*green*) on the east point of Palue beach, and the other (*white*) at St. Antoine creek, S.S.E.  $\frac{3}{4}$  E., and N.N.W.  $\frac{3}{4}$  W., 450 yards apart. When the Petit Pot is passed, the lights in one lead to the anchorage.

Some of the rocks bounding the Malouine channel are above water, or marked by beacons, while others are always under water. The leading mark is the beacon of the Grève Blanche in one with the small isle La Croix, about S.S.W.  $\frac{1}{3}$  S., which, if taken up at least one mile without the outermost visible rocks and strictly adhered to, will lead through in mid-channel in a depth of 3, 4, and 6 fathoms, as far as the Petit Pot de Beurre rock; when within half a cable of this rock, alter course to S.E. by S.  $\frac{1}{2}$  S. for the outer anchorage abreast the Ile de la Croix, where the depth is  $4\frac{1}{2}$  to  $8\frac{1}{2}$  fathoms, sand and shells.

The leading mark for the Grand channel is the red light on Vraç'h island in one with the light on the heights of Lanvaon, S.E. by E. (easterly), or, during day, the steeple of Plouguerneau and lighthouse answer the same purpose; this mark will lead within a short distance of the Petit Pot de Beurre, which pass on its south side when making for the outer anchorage. It should, however, be remembered that, between the entrances of the Malouine channel and the Grand channel there is an extensive rocky bank, with some heads upon it visible at low tide; therefore, if approaching the Grand channel from eastward, do not bring Vierge island light northward of E.S.E., until the church of Ploudalmezeau is open westward of that of Lampaul, bearing about S.S.W.  $\frac{1}{4}$  W.; this will lead northward and westward of the bank,—and by continuing on with the latter mark, will bring Vraç'h light and Plouguerneau steeple in one, as before directed.

Masters of small vessels compelled by circumstances to enter Abervraç'h should pay great attention to the leading marks, or, what is still better, obtain the assistance of some one who is familiar with the navigation. Although the bay is good, the entrances are so difficult that it is visited only by coasters and the smallest vessels.

**L'ABERBENOIT** is immediately westward of Abervraç'h. Fronting the entrance is a rocky bank, the Plateau de Rusven, upon each side of which there is a channel into the river. Within this bank the channels unite, but become much confined by rocks and rocky islets. The depth of water decreases gradually as the creek is entered, till just within Garo island, where, at low spring tides, there is only about  $1\frac{1}{2}$  fathoms. The entrance is very intricate, on which account a pilot should be obtained.

From L'Aberbenoit to Le Four rock\* and Portzpoder the coast trends in a westerly direction, about 8 miles, and afterwards more southerly to cape St. Mathieu; the whole is fronted by rocks and rocky ledges (particularly eastward of Le Four rock),

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\* On the 15th of March, 1874, a *fixed* and *flashing* light will be exhibited from a lighthouse recently erected on Le Four rock. It will show a *fixed* light during 30 seconds and a *flashing* light of 8 distinct flashes, followed by eclipses, during 30 seconds; thus the light will be alternately *fixed* and *flashing* every half-minute. Elevation 92 feet above high water and visible 15 miles. A steam fog-trumpet will be attached to the lighthouse.

the principal of which, the Porsal rocks, have their outer extremity about  $2\frac{1}{2}$  miles from the shore. There are channels among these rocks leading to the different villages upon the coast, but none that should be attempted by a stranger. Argenton and Portzpoder are small and shallow places, inhabited chiefly by fishermen.

**Laberildut.**—The entrance to this place, about  $2\frac{1}{2}$  miles southward of Portzpoder and  $11\frac{1}{2}$  miles E.S.E. from Ouessant lighthouse, is only about a cable wide, and is between rocks that are dry at low water. About half a mile from the harbour's mouth the depth rapidly decreases, though previous to that it had been not less than  $4\frac{1}{2}$  fathoms in the fairway of the channel; the harbour itself dries some 6 or 9 feet above low water level. The leading mark in is the steeple of Breles church, exactly in one with that of Lanildut, E. by S., and when up with the Men-garo rocks (about half a mile outside the mouth of the harbour), steer towards a rock within it.\* Pass this rock on the port hand and bear away, first south-eastward and then north-eastward to the village of Laber, preserving the middle of the harbour so as to have the deepest water.

**Le Conquet.**—Port Le Conquet is about  $6\frac{1}{2}$  miles from Laberildut, and  $1\frac{3}{4}$  miles northward of point St. Mathieu,—just within the peninsula of Kermorvan (between it and the semaphore on point Renard). It consists of a creek more than a mile in length,  $1\frac{1}{2}$  cables broad, the direction of which is nearly East and West. At low springs it is dry; the bottom abreast of the town, a quarter of a mile inside the entrance, being then 5 to 10 feet above the sea level. Vessels entering, keep in mid-channel, at about an equal distance from each shore. The mean rise of springs is 21 feet, of neaps 15 feet,—neaps range 9 feet; it is high water (full and change) at 3h. 46m.

**Kermorvan Light.**—On Kermorvan point there is a lighthouse 59 feet high, which exhibits a *fixed* light at 72 feet above high water spring tides, visible in clear weather about 12 miles.

The outlying dangers in the vicinity of Conquet are, the Grande Vinotière, Renards, and the Basse des Renards. The Grande Vinotière, consisting of two small heads of rock, 3 and 9 feet above water at low tide, lies N.W.  $\frac{3}{4}$  W. 7 cables from Kermorvan point; on its northern end there is a *black* beacon. Kermorvan point should have a berth of a quarter of a mile at least. The Renards consist of three heads, 10, 13, and 15 feet above low water level, springs, and the outermost bears West, distant 2 cables from Renard point. The Basse des Renards has 8 feet over it at low tides, and lies West (southerly) 6 cables from the semaphore on point Renard; it is marked by a *black* beacon. For further directions see those given hereafter for the Passage du Four.

**St. Mathieu Point Light.**—The lighthouse stands near the extremity of the point, and from an elevation 177 feet above high water, is exhibited a *revolving* light which attains its greatest brilliancy every *half minute*, and is visible in clear weather about 18 miles;—the eclipses are not total within 7 or 8 miles. The importance of this light will be evident upon an inspection of the chart, as by a bearing of it the ship's position may be determined, and a course thence steered for the Four passage, for Brest harbour, or for the west end of the Chaussée de Sein.

Between this part of the coast of France and the island of Ouessant there are numerous small islands, rocks, and rocky shoals, having among them many channels navigable by the native coasters; only two of these channels can be made use of by strangers (and these require the exercise of considerable care)—namely, the Passage du Four, and the Passage de Fromveur. The whole will be better understood by an inspection of the chart than by any description of them, however carefully written,

\* We believe that the rock is marked by a perch.

that we could give, we shall therefore confine our remarks to the channels on their eastern and western sides.

Many of the rocks are extremely steep, especially the western and southern. The depth almost immediately off them is 17 to 46 fathoms.

**PASSAGE DU FOUR.**—The Passage du Four, the channel between the rocks and the coast, has for its leading mark St. Mathieu lighthouse in one with the extremity of Kermorvan point, or, at night, in one with the light on that point, bearing South (a little westerly). Approaching from northward, the first rock met with is the Four or Oven (so named from its resemblance to an oven), a large black rock, always above water, lying about a mile from the coast north of Portzpoder, and E.  $\frac{2}{3}$  S.  $10\frac{1}{2}$  miles from Ouessant north-east lighthouse; this rock is very conspicuous when leaving Ouessant to sail to Brest,—it should not be approached nearer than a quarter of a mile. About a mile westward of the Four there is a small patch of  $5\frac{1}{2}$  to 6 fathoms, known as the Basse Boureau, which lies with Landunevés church in one with the southern part of the Ile d'Iock and St. Mathieu point seen open 17' westward of point Corsen; between it and the Four rock the depth is 12 to 22 fathoms. The next (the Basse Meur) is  $2\frac{3}{4}$  miles to the W. by S.  $\frac{3}{4}$  S. of the Four rock, and is a dangerous shoal, of which the exact soundings are not known, but the depth around it is  $9\frac{1}{2}$  to  $25\frac{1}{2}$  fathoms; it lies with St. Mathieu lighthouse appearing between the peninsula of Kermorvan and the point of Kermorvan and Landunevés mill in one with a rock close to the shore, known as the Little Melgorne. Within the Basse Meur, and close to the shore, are many dangerous reefs, of which some appear just above the water at low tide, but as they are out of the track of vessels, the passage being westward of the Basse Meur, we shall not attempt to describe them.

On the opposite side of the Passage du Four are several dangerous ledges, the outermost of which and those most in the way of vessels tacking hereabout, are the Basses St. Charles and St. Louis; the former is a small patch of 6 fathoms, lying  $2\frac{1}{2}$  miles W.S.W.  $\frac{1}{4}$  S. from the Basse Meur, with Ploumoguier church in line with a small rock (the Goatlock) close to the shore, and has around it a depth of 12 to 25 fathoms on sand, rock, and broken shells. The Basse St. Louis, about three-quarters of a mile south-eastward of the Basse St. Charles, has not more than  $2\frac{1}{2}$  fathoms water upon it, with a similar depth in its close proximity: its marks are Portzpoder church open a little to the right of Great Liniau rock, and La Helle rock,\* open 38' to the left of Molene island, S.W. by W.  $\frac{1}{3}$  W. A short distance south-westward of this is a patch of 7 fathoms.

Continuing with the leading mark on, the course after passing the Basse St. Louis will be between the Platrèsses (on the west side) and the Valbelle (on the east side); this is the narrowest part of the channel. The Platrèsses are S. by E.  $\frac{1}{2}$  E., about  $1\frac{1}{2}$  miles from the Basse St. Louis, and about midway between the shore and the Plateau de la Helle; they consist of a bank of rocks about three-quarters of a mile in extent, of which several heads are from one to 12 feet above the surface at low water. The mark that clears them on the north side is Plouarzel church appearing between Fourches rocks, bearing S.E. by E.  $\frac{1}{3}$  E.; and on the south side, the ruins of Trezien mill in one with Goatlock rock, bearing E. by S.  $\frac{3}{4}$  S.;—their eastern side is now

\* La Helle rock is high, and appears like a ship under sail. It is distant  $6\frac{1}{2}$  miles S.E.  $\frac{1}{3}$  S. from Ouessant light upon an extensive bank of the same name, which is dangerous throughout its extent, as many heads of the rocks appear just above the surface when the tide is down. The passage between this bank and the Platrèsses is about  $1\frac{1}{2}$  miles wide, and 6 to  $32\frac{1}{2}$  fathoms deep, upon a very irregular rocky bottom.

Between La Helle bank and the islands south-westward from it there is no passage that can be used by a stranger, on account of the numerous rocks that lie scattered.



guarded by two red beacon buoys. The Valbelle is two-thirds of a mile eastward of the Platrèsses, and exactly on the bearing given to avoid the northern side of those rocks; it consists of one small patch 10 feet under water, and with a depth close to it of 6 to 9 fathoms,—a bell buoy guards its western side.

When clear of the Platrèsses and the Valbelle there will be another 8-foot spot (the Tendoc) to guard against. This patch is the outermost of several lying between it and the Goaltock rock, and from it Trezien mill (ruins) appears over the Goaltock, E. by S.  $\frac{3}{4}$  S., the latter distant nearly one mile; it is marked on its western side by a *black* beacon buoy.

Having arrived southward of the Tendoc the lighthouse can be opened more westward of Kermorvan point to clear the Basse St. Paul, an isolated patch of 15 feet water, lying W. by N.  $\frac{1}{4}$  N., a mile from the semaphore on point Corsen. Between it and that point are also several 12 to 20-foot patches.

The channel is now clear and of good width, with a depth varying from 8 to 12 fathoms, but as the peninsula of Kermorvan is approached, there will be the Basse St. Pierre and the eastern bank of the Courleau to avoid. The former, 17 feet under water, lies  $1\frac{3}{4}$  miles N. by W.  $\frac{3}{4}$  W. from Kermorvan point; the latter, whereon the depths are 6, 11, and 17 feet, is rather more than  $1\frac{1}{2}$  miles N.N.W.  $\frac{1}{2}$  W. from the same point. Both these dangers will be avoided by not bringing St. Mathieu lighthouse more eastward than S.  $\frac{1}{4}$  E.

Anchorage can be obtained in the Anse des Blanc Sablons (Whitesand bay) on the north side of Kermorvan peninsula, in 4 to  $7\frac{1}{2}$  fathoms, fine sand; but the bay, though clear of outlying dangers, is open to north and north-westerly winds.

Kermorvan peninsula is rocky, and a short distance off it are two rocks named Normand and Petite Vinotière, which appear only at low water. The rock known as the Grande Vinotière (before mentioned in our remarks upon Conquet) lies in the middle of the Passage du Four, three-fourths of a mile from Kermorvan point; it shows only at low water, so that in sailing through the channel caution is requisite to avoid it,—it is now, we believe, marked by a *black* beacon. Kermorvan point should have a berth of not less than a quarter of a mile, and if intending to go into Conquet, it is necessary to wait until there is water enough in the entrance, and then steer in, keeping in the middle of the channel. From off Conquet, keep away from the coast, to avoid the Basse Renards, already described, which is more than half a mile West of Renards semaphore, and marked by a *black* beacon. There is now a clear channel  $1\frac{1}{4}$  miles in width, till abreast St. Mathieu light; do not, however, stand towards the shore into less than  $4\frac{1}{2}$  fathoms, or nearer than half a mile.

In leaving the Passage du Four, the best channel is between the Vieux Moines and the Basse du Chenal. The Vieux Moines consist of several heads of rock, the highest of which is 23 feet above low water; they lie half a mile S.W. from Point St. Mathieu, and are steep, the depth close to their outer edge being 8 fathoms,—between them and the point it is 20 to 6 feet. The Basse du Chenal is a small bank of 5 to 9 feet, distant  $1\frac{1}{2}$  miles W.  $\frac{1}{4}$  S. from the lighthouse on St. Mathieu point; from it Kermorvan point is in one with Portzmoguer sands, and around it on all sides is deep water. At about three-quarters of a mile westward of the Basse du Chenal are some rocks above water, called the Bossemens.

To pass between the Vieux Moines (Old Monks) and St. Mathieu point, keep pretty close to those rocks, because a sunken ledge extends some distance from the point, and about half a mile eastward of the lighthouse there are some rocks above water known as the Respects, which run out fully half a mile from the shore in a south-

westerly direction; the water close to the latter is deep, so that in using this passage considerable caution is necessary to avoid them.

Vessels passing from southward to northward through the Passage du Four will find no great difficulty in reversing the foregoing directions; it is, however, necessary to remember that the leading mark cannot be brought on till Kermorvan point is passed, and that it must be very strictly adhered to in going between the Tendoe, Valbelle, and Platrèsses (the narrowest part of the channel). The tides set strongly through it, the flood northward, and the ebb southward.

**PASSAGE DU FROMVEUR.**—The Passage du Fromveur, directly eastward and southward of Ouessant, is nowhere less than a mile in width, and 17 and 18 to 50 fathoms deep, on a bottom mostly of rock,—the shallowest is also the narrowest part. Here the tide runs very rapidly, generally exceeding 4 knots, so that the passage must be considered dangerous, and only to be used in necessity, and then only with the tide. The course through is about E. by N. and W. by S. The northern side of the channel is bounded by a reef of rocks, of which many parts show at low water; this lines the shore of Ouessant, and extends from it about two-thirds of a mile. Entering from northward, the first rock met with on the eastern side is the Loédoc, which is always above water; at a short distance westward from this is another, the Men Tensel, which dries 13 feet in height,—the two rocks are connected by a rocky ledge, mostly under water. A little south of this is a group of dry rocks, known as the Bannec; and there are several other dangers still further to the south-westward.

Vessels beating through the Passage de Fromveur must avoid bringing the largest Loédoc rock northward of N.E. by E.; this mark clears all the rocks and sunken dangers on the eastern side of the channel, including the Pierres Vertes. The south side of Ouessant should also not be approached nearer than three-quarters of a mile, to clear the danger on the western side of the channel.

**OUESSANT.**—Ouessant is an irregular craggy island, about 4 miles in length eastward and westward, and 2 miles in breadth. From various parts of the English coast it bears as follows:—

	MILES.
From St. Catherine point (Isle of Wight) . . . W. by S. $\frac{1}{2}$ S. . .	191
„ Bill of Portland . . . . . S.W. by W. $\frac{1}{2}$ W. . .	157
„ Start point . . . . . S.W. $\frac{3}{4}$ W. . . . .	117
„ Eddystone lighthouse . . . . . S.W. $\frac{1}{3}$ S. . . . .	106
„ Lizard lights . . . . . S.S.W. . . . .	88
„ Bishop light (Scilly) . . . . . S. $\frac{3}{4}$ E. . . . .	99

The tide flows at Ouessant on the days of full and change till 3h. 32m.; the average rise of springs is  $19\frac{1}{4}$ , and neaps  $13\frac{3}{4}$  feet,—neaps range  $8\frac{1}{4}$  feet.

**Lights.**—The lighthouse on the north-eastern end of the island shows a *fixed* light, at 272 feet above the sea, visible in clear weather at the distance of 18 miles. That on the north-west point of the island shows a *revolving* light, appearing twice *white* and once *red* at intervals of *twenty* seconds. This light is 223 feet above the sea, and in clear weather visible from a distance of 24 miles; its geographical position is lat.  $48^{\circ} 27' 34''$  N., long.  $5^{\circ} 7' 52''$  W.

**Fog-Trumpet.**—During foggy weather a fog-trumpet is sounded at the west end of Ouessant at intervals of ten seconds. The blast continues two seconds, and can generally be heard 3 miles off.

**Anchorages.**—On the south-western side of the island is Lampaul bay, which is difficult to enter on account of the reefs that extend from the island, some of which are dry at low water, and all more or less cause heavy breakers, even during a moderate

sea. The depth at the entrance between the rocks on each side is 40 fathoms, on rock and small shells, whence it decreases gradually to 5 and 6 fathoms at the head of the bay. In the middle of the bay there is a rock named Corcé, which is always above water; a clear passage is on each side of it. When entering, bring this rock to bear East, and keep it so until up with it, when pass it on either side as may be convenient.

The southernmost rock of the reefs extending from the south-western side of the Ouessant is the Jument, a small isolated rock, which is 18 feet in height at low tide; it is a very formidable danger, as the depth close to it on all sides, except the north-eastern, is 19 to 25 fathoms;—it lies rather more than a mile about W.S.W. from the nearest point of the island, and from it Bélanger mills appear open  $2^{\circ}$  to the right of Corcé rock. About two-thirds of a mile N.W. by N. from the Jument is the Basse Bridy, some heads of which are awash or nearly so; this reef is also very steep. On the opposite side of the entrance to the bay of Lampaul, a rocky ledge extends some distance from the land, and dries in several places. The outermost of this ledge, Leurvas rock, is 4 feet above the sea at low water, and more than half a mile from the land.

On the northern and eastern sides of the island are two bays, frequented only by the native vessels, which occasionally anchor here. The most eastern, Stiff bay, is dangerous, on account of several rocky ledges in it, and is quite open to gales from north-eastward and eastward. The other bay, Beninou, is well sheltered from westerly winds by a small island named Keller; here small vessels anchor in  $8\frac{1}{2}$  to 12 fathoms, on sand and rock, and ride securely from all winds except those from northward;—the rocks on each side of the entrance are very steep, the depth close to them being 18 fathoms.

**Basse Callet, &c.**—From Keller island a rocky ledge extends  $1\frac{1}{4}$  miles to the N.W. by W., and dries in various places. Its outermost ledge, the Basse Callet, has 11 fathoms on it, with 37 or 40 fathoms close-to; but immediately within it is much shoaler water, so that no attempt must be made to go between it and the island,—vessels, in approaching this part of Ouessant, would do well not to go nearer the lighthouse than  $4\frac{1}{2}$  and 5 miles. The marks for the Basse Callet are the north-eastern lighthouse in one with the centre of Keller island, and Bélanger mills in one with the western part of Callet rock.

**Ouessant Bank.**—Nearly  $2\frac{1}{4}$  miles south-westward from the Jument rock on the southern side of Lampaul bay is Ouessant bank, a shoal about  $1\frac{3}{4}$  miles long, and half a mile broad, on which the depth is 26 to 40 fathoms, on broken shells. Around it on all sides is a depth of 50 to 60 fathoms, on the same description of bottom; and, between it and Ouessant, 50 to 26 fathoms.

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## OUESSANT ISLAND TO THE CHAUSSEE DE SEIN.

**Rocks between Ouessant and the Coast.**—The westernmost patches of the rocks between Ouessant and St. Mathieu point are the Pierres Vertes (Green stones). These consist of sunken rocks, which become dry in several places at low tide, at that time appearing about 7 feet above the surface; their western part is  $5\frac{1}{2}$  miles S. by E. from Ouessant North-western lighthouse, and the marks for it are Ar Men Guen Gondichoc rock, seen between the barracks and semaphore on Molene island, and Bannec rock N.E.  $\frac{3}{4}$  E. About 4 miles S.S.E.  $\frac{1}{4}$  E. from this, is another patch of rock known as the Cleu Basseven; and about  $1\frac{3}{4}$  miles further on is the Boufoulloc, a sunken rock, having but 2 feet water on it, upon which H.M.S. *Magnificent* was unfortunately wrecked in 1804; and two-thirds of a mile outside this line of direction lies the Basse



Occidentales des Pierres Noires, which is 12 feet under water. Near the Boufouloc are the Pierres Noires (Black rocks), which are always above water, close to which is a depth of 15 to 17 fathoms. From the Pierres Noires a ledge of rocks, of which part is above water, extends eastward almost to St. Mathieu point, and is known as the Chaussée des Pierres Noires. The most prominent rocks of this ledge are the Chiminées, Le Ranvel, Basse Large, &c.

The western side of the Pierres Noires should not be approached nearer than  $2\frac{1}{2}$  miles. On their southern side they are so steep, that the depth along them at no great distance is 35 to 20 fathoms. At the distance of about 5 miles southward of them there is good anchorage, with easterly winds, in 32 fathoms, fine sand; at 6 miles distance the depth is 34 to 40 fathoms, on sand,—and thence southward nearly the same soundings can be obtained.

The outermost of the group in a south-easterly direction is the Basse Royale, from which St. Mathieu lighthouse bears E. by N.  $\frac{2}{3}$  N., distant rather more than 3 miles; on it is a depth of 4 fathoms at low-water spring tides. It lies with the Diamant\* and Ranvel rocks in one, N.W.  $\frac{3}{4}$  W., and the Bossemen Oriental open  $1^{\circ} 23'$  to the left of point Corsen.

**BREST.**—The approach to Brest harbour is rendered difficult, on the northern side by the rocks and shoals between Ouessant and St. Mathieu point, and on the southern side by the Chaussée de Sein; besides which there are a number of isolated dangers within them, requiring great attention to guard against, before the entrance, the Goulet de Brest, is reached. This is the only entrance into the harbour; it is narrow, being not more than a mile in width; is defended on both sides by strong forts, and is deep enough for the largest vessels; the land on the southern side is moderately bold, and clear of all danger, as is also that on the northern side, the only impediment to its free use being some rocks in the fairway. Kelern peninsula, on the south side of the Goulet, is 3 miles in length and  $1\frac{1}{3}$  miles in breadth, where broadest.

Brest harbour is one of the finest harbours in Europe, and one of the principal stations of the French navy. It consists of a large land-locked bay upwards of 20 miles in circumference, with two deep branches, one of which receives the river Landerneau, and the other the river Chateaulin. The water is deep enough for the largest vessels, and there is room sufficient for 500 sail of large ships to ride securely. The basin or roadstead is 5 or 6 miles across, and the principal anchorage is about a mile from the town.

The town of Brest is partly on the slope of a hill, on the north side of the harbour, and about 2 miles within the Goulet. Here there is a magnificent arsenal, vast building slips, docks, magazines, and workshops; but very little commerce is carried on, the docks being appropriated to vessels of war. The town is separated from the suburb of Recouvrance by a deep-tide inlet, alongside which is the dockyard; the passage into this inlet is over a bar, upon which, at low spring tides, the depth is  $2\frac{1}{2}$  fathoms.

At Brest it is high water on the days of full and change at 3h. 47m. The average rise of springs is 19 feet, of neaps  $13\frac{3}{4}$  feet,—neaps range  $8\frac{3}{4}$  feet.

**Lights.**—Besides the *revolving* light on point St. Mathieu, the *fixed* light on the Bec du Raz, and the *flashing* light on the Ile de Sein, the approach to Brest harbour is facilitated at night by three other lights,—one on point Toulinguet (on the southern side of the entrance to the Goulet), another on point Minou (on the northern side of the Goulet), and the third on Portzie point (at the inner end of the Goulet). The light on point Toulinguet is a *fixed red* light, 161 feet high, and visible at the distance of

\* A lighthouse is to be erected on the Diamant rock, in lat.  $48^{\circ} 18' 50''$  N., long.  $4^{\circ} 54' 9''$  W.

10 miles. Minou point light is *fixed*, shown at the height of 105 feet above the sea, and visible at the distance of 14 miles. And Portzie point light is *fixed*, but varied by *flashes* every *three minutes* (these flashes are preceded and followed by a short eclipse, which does not appear total within 8 miles); this light is 184 feet high, and visible at the distance of 17 miles. Minou and Portzie lights in one lead to the entrance of the Goulet, southward of the Coq and Basse Beuzec, and northward of the Vandrée, &c.

There is also a *fixed* light on Capucins point, on the south side of the entrance to the Goulet, whose arc of visibility ( $18^{\circ}$ ) covers the deep water channel, so that having this light in sight is a guarantee of being in a safe channel, clear of all dangers on either side. This light is exhibited at an elevation of 207 feet, and is visible in clear weather at the distance of 10 miles.

Two *fixed* lights have been established on the jetties at the western entrance to port Napoleon, each is elevated 33 feet above the sea, and visible 7 miles. The towers are of iron and painted white. The light on the west jetty is *green*, that on the east jetty is *red*. Attached to the latter is a fog-bell.

**Dangers outside the Goulet de Brest.**—The isolated dangers before alluded to as being in the way of vessels approaching Brest harbour, or the anchorages at Bertheaume, Camaret, &c., are very numerous. We shall take them in the following order, beginning with the outermost on each side of the main channel:—The Coq, and the Basse Beuzec (on the northern side); the Vandrée, Basse de l'Astrolabe, the Goemant, the Parquete rock and bank, Trepied, Louzauennou rock and bank, the Corbeau, Basse Pontchou, the Leaches, the Mendufas, and Toulanguet rocks (on the southern side). Approaching Brest bay from south-westward, and making for one of the channels among the foregoing rocks, the Basse de l'Iroise, that of Du Lis, and the Basse Ménéhom will be encountered; or from southward, the Bouc, Chevreau, Chèvre, and the rocks off Pen-hir point.

*Coq.*—From St. Mathieu lighthouse the coast trends in an E. by S.  $\frac{3}{4}$  S. direction about  $2\frac{1}{2}$  miles to point Créarc'h-meur, the western side of the bay of Bertheaume, upon which are a fort and semaphore. Midway, at three-quarters of a mile from the land, is the Coq rock, which lies with the beacon near fort St. Merzan, bearing N.N.W.  $\frac{1}{2}$  W., and Bertheaume castle in one with the extremity of point Créarc'h-meur, E. by N.  $\frac{1}{2}$  N. This rock is very steep, the depth close to it being 8 fathoms, and between it and the land 8 to 10 fathoms; there is consequently a safe passage within it by keeping near the shore, but it is more usual to sail outside it, as less danger is then incurred. It is guarded by a *black* beacon buoy.

*Basse Beuzec.*—About  $1\frac{1}{2}$  miles in an E.S.E. direction from the Coq rock is the Beuzec, a bank of 5 feet at low water, around which (in its immediate vicinity) is a depth of 8 to 10 fathoms, so that it is extremely dangerous for large vessels. The marks by which to know its position are;—the castle of Bertheaume N.N.E., distant a mile, and the lighthouse, chapel, and semaphore on point St. Mathieu in line. It is guarded on its east side by a *black* beacon buoy.

The lights on points Minou and Portzie in one, lead southward of the Coq and Beuzec, and northward of all dangers on the southern side of the channel.

*Vandrée.*—The outermost of the rocks on the southern side of the channel is the Vandrée, a small patch of 6 feet water, which lies with the two peaks of the Siège rock (in the Ouessant group), open a little to the right of the Chiminées rocks, bearing N.N.W.  $\frac{1}{4}$  W., and the tower of Crozon just open to the left of the Fourche rock, S.E. by E.  $\frac{3}{4}$  E. From it foul ground of 12 to 16 fathoms extends in a westerly direction about a mile. On all sides of this rocky bank the depth is 20 to 25 fathoms, so that the greatest caution is necessary to avoid the Vandrée. This danger is marked by a bell buoy, moored just within it, on its eastern side.

*Goemant and Astrolabe*.—About half a mile to the E.S.E. of the shoal part of the Vandrée, is the Goemant, a small patch of 5 fathoms; and at three-quarters of a mile N.E. by E.  $\frac{1}{4}$  E. from the same shallow part of the Vandrée, is the Astrolabe, a little shoal of  $4\frac{1}{2}$  fathoms.

*Parquetes*.—The Parquetes lie eastward from the Vandrée about 2 miles, at about  $4\frac{1}{2}$  miles S.  $\frac{1}{2}$  W. from St. Mathieu lighthouse. They are dry at low water, and appear at that time 6, and 20 feet above the surface; around them is deep water, except at the distance of half a mile E.S.E. from the highest, where is a depth of only 7 feet.

*Trepied*.—The Trepied lies more into the channel than any of the rocks on its southern side. Its highest head is 9 feet above low water. Lochrist steeple in one with fort St. Merzan, and the southern extremity of the Lignes de Kelerenn, open a little north of Grand Gouin point, are the cross marks for this rock. Its north side is now guided by a buoy.

*Louzaouennou*.—At the distance of half a mile S.W. by S. from the Trepied, is the Louzaouennou rock, which is just awash at low water. Two patches of about  $3\frac{1}{2}$  fathoms water lie near it; one is about a cable from its northern side, the other a short distance from its southern side.

*Corbeau and Basse Pontchou*.—The Corbeau, on the western side of the Passage du Corbeau, is 14 feet high when the tide is down. It lies S.S.E. two-thirds of a mile from the Trepied, with the church of Lochrist just open westward of fort Merzan. On the eastern side, the Passage du Corbeau is bounded by the Pontchou bank, upon which the depth is 6 to 13 feet, the shoalest part being a quarter of a mile West from the Corbin, a rock always above water. The Corbeau channel is narrow and deep; but should not be attempted by a stranger.

*Leac'h Rocks*.—The Leac'h rocks, a group of rocks above and under water just eastward of the Pontchou bank, occupy a space of half a mile from north to south, and a quarter of a mile from east to west, and bound the narrow channel of Petit Leac'h on the north-western side. The leading mark for this channel (the mill of Roscanvil, in one with the rocks off Toulinguet point, E. by N.\*) clears the southernmost Leac'h rock, upon which there is, or was, a beacon; and by not approaching the largest rock nearer than a third of a mile, the 12-foot patch will be cleared on its northern side.

*Mendufa and Toulinguet*.—The Mendufa and Toulinguet rocks separate the Passage du Toulinguet from that of Petit Leac'h. The former, consisting mostly of sunken rocks, lie W.S.W. from the Toulinguet largest rock: they extend N.E. by N. and S.W. by S. two-thirds of a mile. There is a narrow channel between these two groups, used by the natives and pilots. If intending to run through the *Passage du Petit Leac'h*, bring the leading mark on (Roscanvil mill in one with the rocks off Toulinguet point, E. by N.) when about  $2\frac{1}{2}$  or 3 miles from the point, and follow it pretty closely, until nearly abreast Toulinguet rock, when steer north-eastward so as to give it as well as the point a good berth. The *Passage du Toulinguet* is between the rock and point of that name. Approaching it from westward be careful of the southernmost patch (2 feet) of the Mendufas, to avoid which it is advisable to keep within three-quarters of a mile of Pen-hir point and rocks, and then pass through the narrow part of the channel by giving Toulinguet point a berth of a quarter of a mile. Pen-hir rocks are steep.

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\* The best mark for Petit Leac'h channel is the summit of the road to Paris (behind the town of Brest), seen exactly in the middle of the Goulet, bearing E.N.E. (nearly), as this will lead through in mid-channel clear of all danger.



*Basse de l'Iroise.*—The Basse de l'Iroise, the south-westernmost of the outlying rocks, is a bank of 4 fathoms, lying  $2\frac{1}{2}$  miles S.S.W.  $\frac{3}{4}$  W. from the Vandrée. Its marks are Lochrist mill just open to the right of the chapel of Notre Dame de Grace de St. Mathieu, about N.N.E.  $\frac{3}{4}$  E.; Roseanvil mill (on Kalernn peninsula) in one with the most northerly rock off point Toulinguet, E. by N. (nearly); and Lansmarc'h point in one with the summit of Ménéhom mountain, E.S.E.

*Basse du Lis.*—The Basse du Lis, E.  $\frac{2}{3}$  S.  $2\frac{1}{2}$  miles from the Basse de l'Iroise, is the next rock encountered when bound into Brest from south-westward, after passing that shoal. Upon it the depth is 5, 11, and 21 feet; from the first (5 feet) the church of Lochrist appears in one with the Pignons de Keravel, and St. Sebastien mill in line with Toulinguet rocks, nearly E. by N.  $\frac{2}{3}$  N. The length of this shoal is about a quarter of a mile, and the depth around it 18 to 20 fathoms, so that it should be carefully guarded against.

*Basse Ménéhom.*—The Basse Ménéhom,  $1\frac{3}{4}$  miles eastward of the Basse du Lis, has three shallow spots, of which, the South-west rock is 13 feet under water; the Middle rock 22 feet, and the North-east rock 19 feet. The first of these lies with Lochrist church bearing North, and Toulinguet rock N.E. by E.  $\frac{1}{4}$  E.; and the last with the same church N.  $\frac{1}{3}$  W. and the rock N.  $\frac{3}{4}$  E.;—these two rocks are distant from each other nearly two-thirds of a mile in an E.N.E. and W.S.W. direction,—the Middle rock is between them, but rather nearer the South-west than the North-east rock.

*Bouc, Chevreau, and Chèvre.*—The Bouc, Chevreau, and Chèvre, three rocks which dry respectively 23, 20, and 22 feet in height at low water spring tides, lie between cape Chèvre and point Dinant,—the Bouc, at the distance of  $2\frac{3}{4}$  miles N.W.  $\frac{3}{4}$  N. from the south-west extremity of the cape; the Chevreau  $3\frac{5}{16}$  miles N. by W. from the same point, and the Chèvre (which is two-thirds of a mile within the Chevreau) at  $1\frac{1}{2}$  miles W.  $\frac{1}{2}$  N. from the middle of point Dinant. Toulinguet rock seen clear either eastward or westward of the outermost rock off Pen-hir will clear the Bouc and the Chevreau.

*Tas de Pois.*—The rocks known as the Tas de Pois extend westward from Pen-hir point more than a mile, and are all above water and steep. No attempt should be made to pass through the narrow channels among them, and in rounding their southern side it is necessary to be careful of the *Basse de Dinant*, which lies from the outermost rock S.E.  $\frac{2}{3}$  E. rather more than half a mile, and has only 8 feet water on it, with 7 to 11 fathoms inside it.

The foregoing rocks comprise the dangers in the approach to the Goulet de Brest. Among them are numerous passages, but the only one recommended to a stranger is that which is bounded on the south by the Vandrée, Parquetes, Trépied, &c.

**Directions.**—At night the lights on points Minou and Portzie in one lead to the entrance of the channel, clear of the Coq and Basse Beuzec on the north, and the Vandrée, Parquetes, &c., on the south side. The Coq may be passed on all sides; during day vessels will go southward of it by steering about S.E. by E. from St. Mathieu point (taking care to keep the north end of the isle of Biniguet well open of it) until Lochrist mill (upon the land to the northward), bears N. by W.  $\frac{1}{4}$  W., when they will have passed it. The Beuzec may be passed on all sides; but the best way is to run northward of it, and alongshore, at the distance of two cables from the latter,—sailing S.E. by E.  $\frac{1}{3}$  E. across the bay of Bertheaume.

In sailing through the Goulet, be careful to avoid the Plateau des Fillettes (marked by a buoy on its northern side), the Basse Goudron, and Mengam rocks, which lie right in the fairway. The *Fillettes*, the outermost, has some rocks upon it which un-

cover, and others with only a few feet water over them; these rocks are very steep, and lie two-thirds of a mile N.  $\frac{1}{2}$  W. from a rocky islet off point Capucins. The *Mengam* is  $8\frac{3}{5}$  cables E. by N.  $\frac{1}{2}$  N. from the dry heads of the Fillettes, and has a beacon upon its highest rock. The *Basse Goudron* is nearly midway between them; in the same line of direction; it has two shallow spots of 2 and 5 feet only. The *Mengam* is half a mile from the shore at fort Cornouailles. Having passed these in entering the Rade de Brest, give point Espagnols a berth of a quarter of a mile to avoid the Cormorandière, a sunken rock 22 feet in height at low springs, which lies E. by N.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  cables from the extremity of the point; the narrow passage between this rock and the point, though 6 fathoms deep, should not be attempted by strangers. When the town of Brest appears open of Portzic point, steer for it and anchor in 8 or 9 fathoms, or further out, in 15 or 10 fathoms.\*

**BERTHEAUME BAY.**—Bertheaume bay,  $3\frac{1}{5}$  miles eastward of St. Mathieu point, is free from danger, except that a few rocks lie immediately off its western point. The anchorage is in 8, 10, to 12 fathoms, sand and mud. The shelter is from N.E., N.N.E., and N.W. winds.

**CAMARET BAY.**—Camaret bay, 2 miles southward of Capucins point and eastward of Toulinguet point, is about  $1\frac{1}{4}$  miles in width, and three-quarters of a mile deep, with soundings of  $3\frac{1}{2}$  to  $8\frac{3}{5}$  fathoms at low water, on sand and mud. The small port of Camaret in the south-west corner of the bay, being dry at low water, is of service only to small craft, which lie aground sheltered from all winds by a projecting spit having at its extremity a fort.

A correspondent of the *Moniteur de la Flotte*, a few years since alluded to this bay in the following terms: "We left Brest by the South channel, and after passing the fort on point Capucins, about half the extensive bay of Camaret presented itself, its western extremity consisting of the rocky point of Toulinguet.

The port itself has nearly the form of a trapezium, the largest side of which is that containing the quays of the town opposite the promontory of Trez Kouz; that which forms the second side, has the natural dike of rock Madou. This dike, which is several yards above the highest tide, has at its extremity, near the chapel of Notre Dame de Rock Madou, a small fort with moats and a drawbridge. A few yards from this defence, the beginning of a dike, intended, it is said, for the shelter of vessels in the roads, shows a half-finished towering work, like a bar of iron deprived of half its length.

The depth of water in the port only allows access to vessels of 150 or 200 tons, and drawing less than 12 feet. Even vessels of much less draught than this cannot at all times approach the quays. The bottom is good holding-ground, consisting of mud and sand, with weeds here and there, and affords good shelter from every wind excepting the North; with this wind tide-rips are frequent, in consequence of the situation of the port, and the very slight increase of depth from its entrance up to the quay.

That part of the bay situated at the entrance of the port and forming the harbour, affords good anchorage in various depths, with any wind from West, southward to East. The prevailing winds in the fine seasons are, N.W., N.E., and S.E., but towards the equinoxes and during winter severe northerly gales are common in the bay, bringing destruction and wreck to vessels unable to take refuge in the port.

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\* In July, 1846, a notice was issued from the British Consulate, to the effect that a vessel entering Brest roads must steer for the guard-ship (the outermost anchored ship; known by having a white and blue broad pennant at the fore and jury-masts) which would hail her and give instructions for her anchorage. The yellow flag then sent on board must be kept flying until the ship is released from quarantine by an officer of the Board of Health, whose boat comes off from Brest as soon as possible.

At any moment in such a storm a vessel may drag her anchor, drift ashore, and be dashed to pieces by the fury of the sea. Under circumstances of so fatal a character, the bay of Camaret, being open to northward, should be avoided as a dangerous place."

**The Coast.**—Passing round Toulinguet point, the light on which has already been described, to the southward, keep in the middle of the channel between the point and Toulinguet rock, or rather nearer the latter than the former, as before directed. There is anchorage from easterly winds, off a sandy beach, with the extremity of Toulinguet point bearing North, distant half a mile, in from 5 to 7 fathoms, sandy bottom. Vessels may also pass westward of Toulinguet rock through the Passage du Petit Leac'h, by keeping the summit of the Paris road (over Brest) exactly in the middle of the Goulet; this will carry northward of the Pélou or Mendufa rocks (see page 221), between them and the Petit Leac'h rock (upon which is, or was, a beacon) in from  $7\frac{1}{2}$  to 14 fathoms, rocky bottom.

About  $1\frac{1}{2}$  miles southward of Toulinguet point is Pen-hir point, which is steep and rocky, and has five or six large rocks, known as the Tas de Pois, extending off it in a south-westerly direction nearly  $\frac{2}{3}$  of a mile; these are always above water, and steep on all sides, but there is a patch 8 feet under water above half a mile S.E.  $\frac{2}{3}$  E. from the outermost, which must be avoided. From these rocky islets the coast trends to the E.S.E., about  $2\frac{1}{2}$  miles, to the small sandy bay of Dinant, in which the depth is  $6\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms, shoaling gradually to the head of the bay. The coast then trends southwards about  $4\frac{1}{2}$  miles to cape Chèvre, which is forked and makes in two points, and has some small rocks about it, and a sandy spit of  $2\frac{1}{2}$  to 6 fathoms running out above a mile in a W. by S. direction.

Vessels may anchor about  $1\frac{1}{4}$  miles northward of the semaphore on cape Chèvre, and half a mile from an adjacent rocky shore, in 7 or 8 fathoms water, on sandy bottom, sheltered from easterly winds. In coasting between Pen-hir point and cape Chèvre, the outlying rocks, Chèvre, Chevreau, and Bouc (mentioned on page 222) must be remembered; being steep and covered at high water, they are very dangerous,—their positions, therefore, should be carefully shunned. The islet Guénérout is small, and surrounded with a rocky ledge; it lies close to the shore at about  $1\frac{1}{2}$  miles northward of cape Chèvre, and has deep water close to it on all sides, but there is no passage between it and the main.

The south side of cape Chèvre should have a berth of more than three-quarters of a mile, for there are several rocks lying off it, the Basse Laye (the outermost, and nearly awash at low water) being two-thirds of a mile from the land.

**Basse Vieille.**—At the entrance to Douarnenez bay, and  $2\frac{1}{4}$  miles S.W. by W.  $\frac{1}{2}$  W. from cape Chèvre, is the Basse Vieille (a rock 5 feet above the surface at low tide), which is steep on all sides, the depth at half a mile from it being 10 to 17 fathoms, so that in entering the bay considerable caution is necessary to avoid it. It lies with the westernmost of the Tas de Pois rocks in one with the western part of Toulinguet islet, and Men-cos rock (off the eastern part of cape Chèvre) in one with Kidizient mill, bearing E. by N.  $\frac{1}{2}$  N. A bell-buoy now guards this rock on its western side.

**DOUARNENEZ BAY.**—Douarnenez bay, immediately eastward of cape Chèvre, is extremely capacious and commodious. Its entrance is very wide, and the depth over it so regular that its navigation is extremely easy, there being no difficulty whatever if care be taken to avoid the rocks laid down in the chart. These rocks are in the northern and south-eastern part of the bay, and few in number. The outermost of those off the northern shore, the *Pierre Profonde*, is always above water; just within, northward and eastward of this, are the *Taureau* and *Verre* rocks,—these with the *Pierre Profonde*, form a triangle which has a patch of 3 fathoms near its centre,—the *Taureau* uncovers 5 feet in height at low water. Between these rocks and the



shore north-eastward of them, there is a passage half a mile wide and  $4\frac{1}{2}$  to 8 fathoms deep. The rocks in the south-eastern part of the bay, named *Meur* and *Neuve*, have 8 to 17 feet water on them; they lie within three-quarters of a mile of the shore, just eastward of point *Léidé*.

The little town of Douarnenez is in the south-eastern corner of the bay, behind a small island, named *Tristan*. In the roadstead abreast the town, at about three-quarters of a mile from it, the depth is 5 to 6 fathoms, on sand, mud, and shells; thence it decreases very gradually to the shore. Within *Tristan* island is a small inlet which becomes dry when the tide is down.

*Light*.—The lighthouse on *Tristan* island is 31 feet high, and shows a *fixed* light at 115 feet above the sea, visible 10 miles.

The course from about 2 miles off the south-western part of *Ouessant* island to the entrance of Douarnenez bay is S.S.E., and the distance about 30 miles. There is nothing in the way to bring a vessel up, until arriving at the *Basse Vieille*, which may be avoided by observing a clump of trees (with a little chapel in the midst) standing on the north side eastward of cape *Chèvre*, and having a windmill westward, and two eastward of it; when the windmill next eastward of these trees comes just open of cape *Chèvre*, the rock will be passed, and the course may be directed for any part of the bay, all being clear with the exception of the visible rocks and those near the shore. The best ground is, however, considered to be off the north side of the bay, the bottom there, in a depth of 9 to 12 fathoms, being of clear sand. The general depth over the bay is 9 to 17 fathoms, and all, as before observed, is clear ground.

From cape *Chèvre* the bay runs in eastward about 10 miles, and has a general breadth of fully 6 miles. In its northern part there are several spots of rocky and foul ground, some of which appear above the surface; as all these have deep water about them of  $4\frac{1}{2}$  to 8 fathoms, vessels frequenting the anchorage in this part of the bay will have to be on their guard to avoid them. Within these rocks is the little bay of *Morgat*, adjacent to the town of *Crozon*, which is distinguished by a high black tower.

If bound to Douarnenez, go southward of the *Vieille* rock, as a course may then be directed towards the town without any impediment whatever until past point *Léidé*, eastward of which are the two small sandbanks, *Meur* and *Neuve*, the former having 17 or 18 feet water over it, the latter 8 and 9 feet; by keeping a mile from the land both these will be avoided.

**The Coast**.—From Douarnenez bay, the coast trends 6 miles in a westerly direction to point *Van*, and is high and steep, with several steep points projecting into the sea, which are dangerous to approach, being surrounded with rocks. Point *Van* has numerous rocks and rocky patches about it; these extend in a westerly direction from it about a mile, and are separated by narrow channels of sufficient depth for vessels of light draught.

*Basse Jaune*.—The *Basse Jaune*, a mile N.E. from point *Van*, is a small patch which dries 2 feet in height when the tide is down; it is seated on a bank of  $7\frac{1}{2}$  to 10 fathoms, and from it *Chlec* rock (just off *Van* point) appears in one with the extremity of the *Bec du Raz*. Although the depth between it and the shore is 14 to 20 fathoms, strangers should avoid making an attempt to pass through the channel.

From point *Van* the coast trends south-westward to the *Bec du Raz*, a distance of  $1\frac{3}{4}$  miles, and forms the small bay of *Trepasses*, in which is a depth of 16 to 4 fathoms, shoaling gradually upon a bottom of fine grey sand.

**Bec du Raz**.—The *Bec du Raz* has rocks above and under water, extending from it three-quarters of a mile in a W.N.W. direction. These, as well as the point, are steep, and therefore should be approached with caution.

The lighthouse on the highest part of the Bec du Raz shows a *fixed* light at 259 feet above the level of high water spring-tides, visible in clear weather at the distance of 18 miles. The building is 49 feet high.

**RAZ de SEIN.**—The channel known as the Raz de Sein, between the rocks off point Van, the Bec du Raz, and the Chaussée de Sein, is much encumbered with rocky and shallow patches, and requires, consequently, very careful navigation. In the direction of N.N.W. from the Bec du Raz there is a bank of rocks, about  $1\frac{1}{4}$  miles in length and breadth, which divides the northern entrance into two channels. The largest of these islets or rocks, in nearly the middle of the group, is named Tevennec, and appears very conspicuous, as it is high and can be seen at a considerable distance. It bears from the Ile de Sein signal post nearly E. by N., distant  $3\frac{1}{2}$  miles, and is surrounded by many sunken rocks, so that in going through the channel great caution is necessary, more particularly because the stream sets over them with considerable force; for it is to be observed that here the tides run very strongly, the flood northward and the ebb southward. A berth of fully a mile should, therefore, be given to the highest of the Tevennecs, and also to point Vau,—proper allowance also being made for the set of the tide.\*

The Bec du Raz must also have a wide berth given it, as several rocks lie off it in a W.N.W. direction; of these, the highest and most distant from the land is the Vieille (Old Woman),—near this rock, at about half a cable to the south-westward, is another under water, named Plate.

The western side of the Raz de Sein is bounded by a ridge of rocks (which extends a considerable distance from the Ile de Sein) known as the Pont des Chats (Cats' Bridge). Some of these rocks uncover at low tide, and the easternmost one bears from the Vieille W.  $\frac{1}{4}$  S., 2 miles; consequently, considerable caution is necessary not to approach the island too closely. Besides these dangers, there are some isolated patches in the southern part of the Raz, which have 10, 26, 27, and 35 feet water over them at low tide. The first, named *Cornoc Bras*, bears from Ile de Sein lighthouse S.E.  $3\frac{2}{3}$  miles, and from that on the Bec du Raz W.  $\frac{1}{4}$  S.  $2\frac{1}{4}$  miles;—the channel between it and the Pont des Chats is three-fourths of a mile wide, and 4 to 14 fathoms deep. The 26-foot patch is one-sixth of a mile more E.N.E.-ward. The third of these shoals, named *Masclougreiz*, lies with the outer rock (Chlec) above water off point Van in line with the extremity of the Bec du Raz, N.E.  $\frac{3}{4}$  E., at the distance of  $1\frac{1}{2}$  miles from the latter. The last of the shoals, 6 fathoms, is nearly a quarter of a mile eastward from the Masclougriez.

Vessels sailing through the Raz de Sein from southward, may pass the Tevennec on either side; but the eastern channel is considered the best, although the other, with a scant wind, gives the ship the advantage of laying through with tacking, and the stream within it is weaker.

**CHAUSSEE de SEIN.**—The Chaussée de Sein, known also as "the Saints," is an extensive and dangerous ridge of rocks and shoals, 11 or 12 miles long in a S.E. by E.  $\frac{1}{2}$  E., and N.W. by W.  $\frac{1}{2}$  W. direction, and of an average breadth of  $1\frac{1}{4}$  miles. The Ile de Sein upon the eastern part of the Chaussée is low and flat, and bears from the Bec du Raz W.N.W., distant  $4\frac{1}{2}$  miles; it has a village, and its small port (drying with every tide, and surrounded by ledges of rock) is accessible by small vessels through the narrow channels separating the outlying dangers. In this harbour coasting vessels anchor in safety on gravelly mud; but no others can approach it without a pilot. Here it is high water on full and change days at 3h. 21m.; springs rise  $17\frac{1}{2}$  feet, neaps 12 feet,—neaps range  $7\frac{1}{4}$  feet.

\* The erection of a lighthouse on Tevennec rock has been proposed, and one also on Vieille rock off the Bec du Raz.

Many of the rocks on the Chaussée de Sein are dry at low water, but should not be closely approached, as the lead gives little if any warning of their proximity, the depth within a mile of them being 30 to 45 fathoms on rock and broken shells. The most dangerous part of the Chaussée is that nearest the Ile de Sein, where for a space of about  $4\frac{1}{2}$  miles the ridge is studded with rocks more or less above water; this part is known as the Pont de Sein (Saint's Bridge). The outermost part of the Chaussée de Sein bears from St. Mathieu lighthouse S.W. by W.  $\frac{1}{2}$  W. 20 miles, and from Ouessant north-west light S. by W.  $\frac{3}{4}$  W. 24 miles.

**Light.**—The lighthouse on the northern point of the Ile de Sein shows a *fixed (with a flash every 4 minutes)* light, at 148 feet above high water level, visible 18 miles. Each flash is preceded and followed by a short eclipse, which, however, is not total, within the distance of 12 miles. This light is  $5\frac{1}{2}$  miles from that on the Bec du Raz on the bearing of N.  $86^{\circ} 50'$  W. (*true*); this bearing, which is likewise the general direction of the whole chain of rocks, passes about 4 cables southward of the north-western extremity of the chain, which is 9 miles from the Sein light, and  $14\frac{1}{2}$  miles from that on the Bec du Raz.\*

When sailing in the vicinity of this dangerous reef of rocks the greatest circumspection is necessary, and a near approach to it should not be made unless the vessel is in charge of a pilot from the Ile de Sein, as it is possible that all the dangers may not yet have been discovered.

Between the Chaussée de Sein and the Chaussée des Pierres Noires (the group of islets and rocks south-eastward from Ouessant) is the channel named Iroise, in which is a depth of 60 to 30 fathoms on sand, rock, and putrid shells. In the direction of North and N.W. from the western extremity of the Chaussée de Sein the flood runs north-eastward  $1\frac{1}{2}$  miles an hour, and the ebb south-westward about one mile an hour, the flood commencing 5h. 50m. after high water at Ouessant.

In approaching the Chaussée de Sein from westward, the first light seen will be the flashing light on the Ile de Sein, and a bearing of it will show whether the vessel is northward or southward of the line of direction of this light and that on the Bec du Raz. In clear weather the Bec du Raz light will not be seen till the vessel is within 4 or 5 miles of the western extremity of the Chaussée.

When it is intended to pass southward of the Chaussée, a course should be steered so as to open the light on the Bec du Raz to the right, or southward of that on the Ile de Sein: but if it be intended to pass northward of it, or to enter the Iroise, no time should be lost in quickly opening the Bec du Raz light to the left, or northward of that on the Ile de Sein.

The Ile de Sein light bears a great resemblance to that on Penfret island (one of the Glennan islands), but this resemblance should not occasion a mistake, as the light of Penfret is within the horizon of the great light of Penmarc'h, the flashes of which are at half minute intervals, and which, in fine weather, is visible from the Bec du Raz.

**Fouquet Bank.**—About  $3\frac{1}{2}$  miles S. by W. from the western extremity of the Chaussée de Sein there is a small patch of 18 fathoms named Fouquet, from the pilot who discovered it. It is of very small extent, and close to it is deep water of 25 to 30 fathoms on rock and small shells. The sea breaks on it occasionally, but never so violently as on the Chaussée de Sein.

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\* It has been proposed to remove this light to a rock near the eastern extremity of the Chaussée and to erect a lighthouse on the rock Ar-men ( $5\frac{1}{4}$  miles N.W. by W.  $\frac{3}{4}$  W. from the Ile de Sein light) in lat.  $48^{\circ} 3' 2''$  N., long.  $4^{\circ} 59' 1''$  W., or on one of the sunken rocks nearer the western end of the Chaussée.



# APPENDIX.

## GEOGRAPHICAL POSITIONS.

	Latitude.			Longitude.		
	°	'	"	°	'	"
Ile de Sein; lighthouse . . . . .	48	2	40N	4	52	9 W
Bec du Raz; lighthouse . . . . .	48	2	22	4	44	3
Douarnenez; lighthouse on Tristan island . . . . .	48	6	12	4	20	22
Cape Chèvre; semaphore . . . . .	48	10	14	4	33	17
Toulinguet point; lighthouse . . . . .	48	16	50	4	37	52
Portzic point; lighthouse . . . . .	48	21	29	4	32	10
St. Mathieu point; lighthouse . . . . .	48	19	50	4	46	23
Kermorvan point; lighthouse . . . . .	48	21	44	4	47	31
Ouessant; south-west lighthouse . . . . .	48	27	34	5	7	52
Four rock . . . . .	48	31	20	4	47	31
Vierge island; lighthouse . . . . .	48	38	23	4	34	21
Pontusval point; lighthouse . . . . .	48	40	43	4	20	53
Ile de Bas; lighthouse . . . . .	48	44	45	4	1	44
Morlaix; lighthouse on Noire island . . . . .	48	40	23	3	52	39
Plateau de Triagoz; lighthouse . . . . .	48	52	20	3	38	55
Sept Isles; lighthouse . . . . .	48	52	46	3	29	33
Heaux de Brehat; lighthouse . . . . .	48	54	33	3	5	17
Brehat; lighthouse on Paon rock . . . . .	48	51	58	2	59	17
Douvres rocks; lighthouse . . . . .	49	6	28	2	48	54
Saint Quay; lighthouse on Harbour island . . . . .	48	40	2	2	48	36
Cape Erqui; semaphore . . . . .	48	38	30	2	28	17
Cape Frehel; lighthouse . . . . .	48	41	5	2	19	14
St. Malo; lighthouse on Grand Jardin island . . . . .	48	40	14	2	5	4
Besnard point; semaphore . . . . .	48	41	29	1	57	30
Herpin rock . . . . .	48	43	18	1	49	55
Pointe du Grouin; semaphore . . . . .	48	42	37	1	51	48
Mont St. Michel; semaphore . . . . .	48	38	12	1	30	46
Granville; lighthouse on cape Lihou . . . . .	48	50	7	1	36	52
Chausey islands; lighthouse . . . . .	48	52	13	1	49	26
Minquiers; Maitresse islet . . . . .	48	58	17	2	3	52
Jersey; beacon on Grande Anquette . . . . .	49	8	22	1	55	18
" ; Seymour tower . . . . .	49	9	30	2	0	34
" ; ruin on cape Gros-nez . . . . .	49	15	29	2	14	53
" ; lighthouse on Victoria pier, St. Helier . . . . .	49	10	29	2	6	45
" ; Corbière rock . . . . .	49	10	40	2	14	52
Guernsey; Jerbourg tower . . . . .	49	25	40	2	32	10
" ; Hanois lighthouse . . . . .	49	26	2	2	42	10
" ; Castle Cornet . . . . .	49	27	4	2	31	38
" ; lighthouse at St. Peter-port . . . . .	49	27	14	2	32	5
Alderney; St. Anne church . . . . .	49	42	54	2	12	15
" ; Ortach rock . . . . .	49	43	27	2	17	33
" ; Alderney mill . . . . .	49	42	26	2	12	46
" ; Braye light . . . . .	49	43	20	2	12	6
Casquets islets; north-east lighthouse . . . . .	49	43	17	2	22	42
Régneville; lighthouse on Agon point . . . . .	49	0	32	1	34	56
Senequet rocks; lighthouse . . . . .	49	5	32	1	39	49

GEOGRAPHICAL POSITIONS—*continued*.

	Latitude.			Longitude.		
	°	'	"	°	'	"
Chaussée des Bœufs; Bœuf rock . . . . .	49	6	36 N	1	47	6 W
Cape Carteret; lighthouse . . . . .	49	22	27	1	48	31
Cape Flamanville; semaphore . . . . .	49	31	24	1	53	9
Nez de Jobourg; extremity . . . . .	49	40	33	1	56	54
Cape la Hague; lighthouse on Gros du Raz Rock	49	43	22	1	57	21
Cherbourg; lighthouse in fort Querqueville . .	49	40	20	1	41	9
„ ; fort Central (on breakwater) . . .	49	40	28	1	37	14
Cape Levi; lighthouse . . . . .	49	41	50	1	28	28
Cape Barfleur; lighthouse . . . . .	49	41	50	1	16	2
Fort la Hougue; light . . . . .	49	34	19	1	16	27
Saint Marcouf island; lighthouse . . . . .	49	29	55	1	8	52
Grand champ; lighthouse . . . . .	49	23	25	1	2	36
Pointe de Ver; lighthouse . . . . .	49	20	28	0	31	14
Orne river; Oyestreham church . . . . .	49	16	37	0	15	34
Havre; lighthouse on north-west jetty . . .	49	29	0	0	6	4 E
Cape la Hève; southern lighthouse . . . . .	49	30	43	0	4	2
Cape Antifer; semaphore . . . . .	49	41	15	0	9	47
Fécamp; lighthouse on Fagnet point . . . .	49	46	5	0	22	6
Cape Ailly; lighthouse . . . . .	49	55	7	0	57	29
Dieppe; lighthouse on west jetty . . . . .	49	56	2	1	4	57
Cayeux; lighthouse . . . . .	50	11	42	1	30	41
Point Alpreck; lighthouse . . . . .	50	41	57	1	33	41
Boulogne; lighthouse on south-west jetty .	50	43	56	1	35	5
Cape Grisnez; lighthouse . . . . .	50	52	10	1	34	56

## TIDAL STREAMS IN THE ENGLISH CHANNEL.

The following observations on the Tidal streams in the English Channel are condensed from the remarks of the late Admiral Beechy, whose valuable paper, published in the Philosophical Transactions for 1851, and annually reprinted in the Admiralty Tide Tables, has greatly simplified the question of the Channel tides. Hitherto the popular belief has been in a tide and half tide, or, in other words, that the stream runs half a tide longer in mid-channel than it does near the coast; whereas in no part of the Channel does the change of stream differ materially within its fair navigable limits. Both flood and ebb streams turn from one to two hours earlier in the bights of the coast than in the offing, of which fact vessels take advantage when turning to windward.

These observations show that the two Channel streams—that contained between the west end of Dover strait and a line joining the Start and the Gulf of St. Malo; and that between the east end of Dover strait and a line joining the estuary of Lynn and the Texel,—run in opposite directions at the same time, both setting uniformly in a direction *towards* Dover while the water is *rising* at that place, and *away* from it while the water is *falling*. Also that these streams run in opposite directions to the streams outside them, viz., the stream at the mouth of the Channel, and the stream in the North Sea, and that where they meet, the tide is ever varying its direction, according as the strength of one stream prevails over that of the other, producing a rotary motion with scarcely any interval of slack water.

As the Channel streams are always running in opposite directions, there is necessarily a point where they meet and separate, and this occurs in Dover strait, or in the space between a line drawn from Beachy head to the river Somme, and a line from the North Foreland to Dunkerque. But in this strait, the stream, although it obeys first one Channel stream and then the other, does not slack with them, but is found to be still running at high and low water on the shore, at which times those streams are at rest, so that the strait of Dover never has slack water throughout its whole extent at any one time; this in consequence is called an intermediate tide.

Off the mouth of the Channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running northward and eastward, while the water is falling at Dover; and southward and westward while it is rising at that port. The particular direction and rate of the streams at every hour of the tide at Dover are given in the Table following these remarks, and it is only necessary to mention here, that southward of the parallel of Scilly, the tides of the Channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire circuit of the compass in one tide, never remaining long upon any one point, so that any written description of their course is rendered very difficult, and the Table alone must be consulted.

In the space between a line joining the Lands End and Ouessant, and a line joining the Start and Casquets, there is a mixed tide, partaking of the joint directions of the Channel and offing streams. Eastward of the latter line the stream follows the fairway of the Channel, and will carry a vessel towards Beachy head while the water is rising at Dover, and away from it while it is falling.

The gulf of St. Malo, from its high and strong tides, exercises a powerful influence over the navigation of the Channel in its immediate vicinity, and the seaman must be especially on his guard when drawing near this locality. With a falling water at Dover the stream sets sharply into this gulf on both sides of the Channel islands, which the prevalence of westerly winds is said to increase; but with a rising water at Dover it sets across and out of the gulf, the north-eastern part of the stream sweeping round the Casquets towards Alderney, and through the Russel and other channels about Guernsey, towards Alderney race.

On the south side of the Channel, with a rising water at Dover, the stream sets sharply round cape Barfleur into the bay of the river Seine, curving more and more with the bight of the bay until it finally takes the sweep of the shore. With the flood tide the western half of the bay is partly in eddy, and the tide slacks in all that part nearly an hour before high water at Dover, whilst in the eastern part of the bay it runs about half an hour longer than at Dover, so that here a ship beating up Channel towards the end of a rising tide at Dover, may prolong the tide in her favour by standing close over to the French coast eastward of Havre.

On approaching Boulogne, however, at the beginning of a rising tide, great attention should be paid to the direction of the stream given in the Table, as the streams hereabout meet and are turned down upon the French coast, so that a ship, which on the English side would at this time have a stream setting straight up Channel, here encounters one upon her beam, sweeping her down towards the entrance of the river Somme, and hence probably the cause of some of the many disastrous losses which have occurred in this part of the Channel.

In Dover strait, as before observed, the Channel streams meet while the water is rising at Dover, and separate while it is falling there. The point of union and separation is not, however, stationary, but moves from westward to eastward between Beachy head and the North Foreland, a distance of 60 miles, both on the rising and falling tide. When the water at Dover begins to fall, the separation begins off Beachy head. As the fall continues, this line creeps to the eastward; at two hours after high water it has reached Hastings; at three hours Rye; and thus it travels on until at low water by the shore, it has reached the line extending from the North Foreland to Dunkerque. At this time the Channel streams, eastward and westward of Dover strait, have ceased running, and it is slack water; but the intermediate tide in the strait is still running to the westward.

When the water at Dover begins to rise, the Channel streams have made and both set towards Dover; that eastward of the strait consequently goes with the intermediate tide, which has not ceased running to the westward, while that westward of the strait meets it, and this opposition continues throughout the rising water at Dover. The point of meeting begins off Beachy head at low water, and gradually shifts its position eastward as the water rises by the shore; the meeting of four hours before high water is nearly the same as the separation at two hours after high water; and so moves on during the subsequent hours, till about the time of high water at Dover the point of junction has reached the North Foreland, and the Channel streams have ceased running, leaving the intermediate tide in the strait still pursuing its course to the eastward. Within the next hour the Channel streams have made east and west, so that now the intermediate tide falls in with the stream eastward of the strait, and travels with it, whilst it separates from that westward of the strait, dividing at Beachy head, as at first.



# THE MAGNETIC DIRECTION OF THE TIDAL STREAMS IN THE CHANNEL AT EVERY HOUR OF THE TIDE AT DOVER.

In this Table the time of high water at Dover is taken as a standard, so that to find either the time of the turn or the direction of the stream in the Channel, compare the mean time of ship with the time of high water at Dover, and the interval between in the column answering to the ship's position will be found the information required.

Westward of a Line joining Ouessant and the Land's End.

Hours.	North side of Lat. 49° N.						South side of Lat. 49° N.	
	West part.	Rate.	Near Scilly.	Rate.	Seven Stones.	Rate.	West part.	Rate.
Before High Water, Dover.								
(1	W. by N. $\frac{1}{2}$ N.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	N.N.W. $\frac{1}{2}$ W.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	N. $\frac{1}{2}$ W.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	W. $\frac{1}{2}$ S.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.
(2	N. $\frac{1}{2}$ W.		N. $\frac{1}{2}$ W.		N.N.E.		N. by W. $\frac{1}{2}$ W.	
(3	N.E. $\frac{1}{2}$ E.		N.N.E.		N.E. $\frac{1}{2}$ N.		E. by N. $\frac{1}{2}$ N.	
(4	E. by N. $\frac{1}{2}$ N.		N.E. by E.		N.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{1}{2}$ E.	
(5	E. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		E. by N. $\frac{1}{2}$ N.		Turning.	
(6								
After High Water, Dover.								
(5	S.E. by E. $\frac{1}{2}$ E.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	South.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	S. $\frac{1}{2}$ W.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	S. by E. $\frac{1}{2}$ E.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.
(4	S. $\frac{1}{2}$ E.		S.W.		S.S.W. $\frac{1}{2}$ W.		Draining.	
(3	S.S.W. $\frac{1}{2}$ W.		S.W. by W.		S.S.W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ W.	
(2	S.W. by W.		"		S.W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ S.	
(1	W. by S. $\frac{1}{2}$ S.		"		W.S.W.		S.W. by W. $\frac{1}{2}$ W.	

Between { A Line joining the Land's End and Ouessant,  
 " " the Starts and Casquets, and  
 " " the Casquets and Sept Iles.

Hours.	North Side of Channel.					South Side of Channel.				
	West part.	Rate.	Centre.	Rate.	East part.	Rate.	West part.	Rate.	Centre.	Rate.
Before High Water, Dover.										
(1	W. by N. $\frac{1}{2}$ N.	Greatest rate, springs, 2 knots.	W. $\frac{1}{2}$ N.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	W. $\frac{1}{2}$ N.	Greatest rate, springs, 2 $\frac{1}{2}$ knots.	W. $\frac{1}{2}$ S.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	W. $\frac{1}{2}$ N.	Greatest rate, springs, 2 knots.
(2	Turning.		N.W. by W. $\frac{1}{2}$ W.		W. $\frac{1}{2}$ N.		Slack.		West.	
(3	N. $\frac{1}{2}$ E.		W. $\frac{1}{2}$ N.		West.		East.		Slack.	
(4	E. $\frac{1}{2}$ S.		Slack.		S. $\frac{1}{2}$ W.		E. by N. $\frac{1}{2}$ N.		E. by S. $\frac{1}{2}$ S.	
(5	East.		E. $\frac{1}{2}$ S.		S.E. $\frac{1}{2}$ S.		E. by N. $\frac{1}{2}$ N.		E. $\frac{1}{2}$ S.	
(6	E. by S.		"		E. by S. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ N.		S.E. by E. $\frac{1}{2}$ E.	
After High Water, Dover.										
(5	E. by S. $\frac{1}{2}$ S.	Greatest rate, springs, 2 knots.	E. by S.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	E. by S.	Greatest rate, springs, 2 $\frac{1}{2}$ knots.	E. $\frac{1}{2}$ S.	Greatest rate, springs, 1 $\frac{1}{2}$ knots.	E. by S.	Greatest rate, springs, 2 knots.
(4	Slack.		E. by S. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		N.E. by E. $\frac{1}{2}$ E.		Slack.	
(3	Turning.		Slack.		E. $\frac{1}{2}$ S.		Slack.		W.N.W.	
(2	W. by N.		W. $\frac{1}{2}$ N.		Turning.		S.W. by W. $\frac{1}{2}$ W.		Slack.	
(1	W. $\frac{1}{2}$ S.		"		W. by S. $\frac{1}{2}$ S.		S.W. by W.		W. by N.	
									N.W. $\frac{1}{2}$ W.	

Between { A Line joining the Start and Casquets, and  
 " " Beachy Head and Cape Ailly.

Hours.	West part.	Rate.	Centre.	Rate.	East part.	Rate.	Over Hurd's Deep.	Rate.	Off Cape Barleur.	Rate.
Before High Water, Dover.										
(1	W. $\frac{1}{2}$ N.	Greatest rate, flood 2-3 ebb 2-4 knots.	W. by N. $\frac{1}{2}$ N.	Greatest rate, flood 3-8 ebb 3-3 knots.	Turning.	Greatest rate, flood 3-00 ebb 2-40 knots.	W. $\frac{1}{2}$ S.	Greatest rate, flood 2-15 ebb 2-40 knots.	N.W.	Greatest rate, flood 5-4 ebb 5-2 knots.
(2	W. by N. $\frac{1}{2}$ N.		N.W. by W. $\frac{1}{2}$ W.		W. by N. $\frac{1}{2}$ N.		W. $\frac{1}{2}$ S.		"	
(3	W. $\frac{1}{2}$ N.		W.N.W.		W. by N. $\frac{1}{2}$ N.		W. $\frac{1}{2}$ S.		"	
(4	W. $\frac{1}{2}$ S.		W. by N. $\frac{1}{2}$ N.		W. $\frac{1}{2}$ N.		W.S.W.		"	
(5	N.N.E. $\frac{1}{2}$ E.		W. by N. $\frac{1}{2}$ N.		"		W. by S. $\frac{1}{2}$ S.		"	
(6							Slack.		"	
After High Water, Dover.										
(5	E. $\frac{1}{2}$ S.	Greatest rate, springs -	E.S.E.	Greatest rate, springs -	E. by S. $\frac{1}{2}$ S.	Greatest rate, springs -	E. $\frac{1}{2}$ S.	Greatest rate, springs -	"	Greatest rate, springs -
(4	E. by S. $\frac{1}{2}$ S.		S.E. by E. $\frac{1}{2}$ E.		E. by S. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		S.E.	
(3	"		"		E. by S. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		"	
(2	"		E.S.E.		E. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		"	
(1	"		"		"		E.N.E.		"	

Entrance of the Gulf of St. Malo on a line joining Ile Brehat and the south-west side of Guernsey.

Hours.	12 miles from Brehat.		12 miles from Guernsey.		Near S.W. point of Guernsey.		4 miles W. by S. from Casquets.		4 miles W.N.W. from Cape la Hague.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W. by W.	Uncertain.	W. $\frac{3}{4}$ N.	Uncertain.	W. $\frac{3}{4}$ N.	Uncertain.	W. $\frac{3}{4}$ S.	Uncertain.	S.W. by W. $\frac{1}{2}$ W.	Greatest rate, springs, 5 to 7 knots.
	2 S. $\frac{1}{2}$ W.		S. $\frac{1}{2}$ W.		S.S.W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ W.		"	
	3 S. $\frac{1}{2}$ W.		S. $\frac{1}{2}$ W.		"		"		"	
	4 S.E. $\frac{1}{2}$ S.		S.S.E. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		S. by E. $\frac{1}{2}$ E.		S.W. $\frac{1}{2}$ S.	
	5 S.E. $\frac{1}{2}$ S.		S.E. $\frac{1}{2}$ S.		"		S.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{1}{2}$ E.	
Before High Water, Dover.	5 S.E. $\frac{1}{2}$ E.	Uncertain.	S.E. by E.	Uncertain.	S.E. by E. $\frac{1}{2}$ E.	Uncertain.	E. $\frac{1}{2}$ N.	Uncertain.	"	Greatest rate, springs, 5 to 7 knots.
	4 ...		...		E. $\frac{1}{2}$ N.		N.E. $\frac{1}{2}$ N.		"	
	3 N.W. by W.		N.W. $\frac{3}{4}$ N.		S.E. by E. $\frac{1}{2}$ E.		"		N.E. $\frac{1}{2}$ N.	
	2 N.W. $\frac{3}{4}$ W.		N.W. $\frac{3}{4}$ W.		E. $\frac{1}{2}$ N.		N.E. by E. $\frac{1}{2}$ E.		"	
	1 N.W. $\frac{3}{4}$ W.		W. by N. $\frac{3}{4}$ N.		N. by W. $\frac{1}{2}$ W.		N.W. $\frac{1}{2}$ W.		"	

In the bay of the river Seine, south of a line joining Cape Barfleur and Cape Antifer.

Hours.	West Part.	Rate.	Centre.	Rate.	East Part.	Rate.
After High Water, Dover.	1 N.N.W. $\frac{1}{2}$ W.	knots. flood 4.2 ebb 3.7	N.W. by W. $\frac{1}{2}$ W.	knots. flood 3.2 ebb 3.2	W. $\frac{1}{2}$ N.	knots. flood 3.3 ebb 3.0
	2 N.N.W. $\frac{1}{2}$ W.		"		W. $\frac{1}{2}$ S.	
	3 N.N.W.		"		W. by N. $\frac{1}{2}$ N.	
	4 N.N.W. $\frac{1}{2}$ W.		"		W. $\frac{1}{2}$ N.	
	5 Slack.		N.W. by W. $\frac{1}{2}$ W.		W. $\frac{1}{2}$ S.	
Before High Water, Dover.	5 S.S.E.	Greatest rate, springs	S.E. by E. $\frac{1}{2}$ E.	Greatest rate, springs	E. by N. $\frac{1}{2}$ N.	Greatest rate, springs
	4 "		"		E. by N. $\frac{1}{2}$ N.	
	3 S.E. by S.		"		"	
	2 "		"		"	
	1 "		"		"	

Between { A line joining Beachy Head and Cape Ailly, and  
" " the North Foreland and Dunkerque.

Hours.	REMARKS.	West of	East of	South Sand Head.		North Sand Head.	
		Line of Separation.		Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 The Tides separate on a line joining, Beachy Head and St. Valery	W. by N.	N.E. by E. $\frac{1}{2}$ E.	N.E. $\frac{1}{2}$ E.	Greatest rate, springs, 3.3 knots.	N.N.E.	
	2 Hastings and Treport	W. $\frac{1}{2}$ N.	"	N.E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.	
	3 Hastings and Cayeux	W. $\frac{1}{2}$ N.	E.N.E.	N.E. by E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.	
	4 Folkestone and Calais	W. by S.	"	N.E. by E. $\frac{1}{2}$ E.		E. by S.	
	5 South Foreland and Gravelines	S.W. by W. $\frac{1}{2}$ W.	N.E. by E. $\frac{1}{2}$ E.	"		"	
Before High Water, Dover.	6 Ramsgate and Nieuport, passing over North Sand Head, the south line of the Falls, and the banks off Nieuport	W. by S.	{ E. $\frac{1}{2}$ N. and Northward.	S.W. $\frac{1}{2}$ S.	Greatest rate, springs, 3.3 knots.	S.S.W.	
	5 The Tides meet on a line joining, Beachy Head and Pointe d'Ailly.	Line of meeting.		S.W.		"	
	4 Bexhill and Cayeux, both streams turning down towards the River Somme	S.S.E. $\frac{1}{2}$ E.	S. by W. $\frac{1}{2}$ W.	S.W. $\frac{1}{2}$ W.		"	
	3 Rye and the Somme, passing over the Bassurelle, both tides setting to the Somme	S.E. by E. $\frac{1}{2}$ E.	S.W. by W.	W. by S. $\frac{1}{2}$ S.		"	
	2 Dungeness and Touquet point	E. by N.	W. by S. $\frac{1}{2}$ S.	W. $\frac{1}{2}$ N.		"	
	1 Dover and Dunkerque nearly	N.E. by E. $\frac{1}{2}$ E.	W.S.W.	N.N.E.		"	

# TIMES OF HIGH WATER ON FULL AND CHANGE DAYS

At various Ports on the North Coast of France.

Place.	Time.	Rise.		Place.	Time.	Rise.	
		Springs	Neaps.			Springs	Neaps
	H. M.	Ft.	Ft.		H. M.	Ft.	Ft.
Dunkerque . . .	12 8	16 $\frac{3}{4}$	13 $\frac{1}{2}$	Omonville . . .	7 29	15 $\frac{1}{4}$	12 $\frac{1}{2}$
Gravelines . . .	12 0	19	15	Gouey . . . . .	7 6	22	17 $\frac{1}{4}$
Calais . . . . .	11 49	19 $\frac{1}{2}$	15 $\frac{1}{2}$	Dielette . . . . .	6 40	27	20 $\frac{1}{2}$
Cape Grisnez . . .	11 27	21 $\frac{1}{2}$	16 $\frac{3}{4}$	Jersey, St. Helier .	6 29	31 $\frac{1}{2}$	23
Boulogne . . . . .	11 25	25	19 $\frac{1}{2}$	„ Rozel bay . . .	6 8	30	21 $\frac{1}{2}$
St. Valery-sur- Somme . . . . .	11 46	27	21 $\frac{1}{2}$	Ecrehos rocks . . .	6 25	31	22 $\frac{1}{2}$
Houedel . . . . .	11 26	27 $\frac{1}{2}$	21	Carteret . . . . .	6 25	31	22 $\frac{1}{2}$
Cayeux . . . . .	11 5	27 $\frac{1}{2}$	21	St. Germain . . . .	6 20	34	25
Tréport . . . . .	11 9	27	21	Regnéville . . . .	6 20	35	26
Dieppe . . . . .	11 6	27	20 $\frac{1}{2}$	Granville . . . . .	6 13	37	27 $\frac{1}{4}$
St. Valery-en-Caux .	10 46	27	21 $\frac{1}{2}$	Chaussey islets . .	6 9	35	26
Fécamp . . . . .	10 44	23 $\frac{1}{2}$	18	Cancale . . . . .	6 20	37	27
Rouen . . . . .	2 28			Les Minquiers . . .	6 6	35	26
Havre . . . . .	9 51	22	18	St. Malo . . . . .	6 5	35	26
Caen . . . . .	10 57			Erqui . . . . .	5 59	33 $\frac{1}{4}$	24 $\frac{1}{2}$
Quillebœuf . . . .	10 6	9 $\frac{1}{2}$	7 $\frac{1}{2}$	Dahouet . . . . .	6 5	32	23 $\frac{1}{2}$
Honfleur . . . . .	9 29	23 $\frac{1}{2}$	18	Binic . . . . .	6 3	30	22 $\frac{1}{2}$
Dives . . . . .	9 39	21	16	Portrieux . . . . .	6 0	31	23 $\frac{1}{2}$
Merville . . . . .	9 36	21	17 $\frac{1}{4}$	Paimpol . . . . .	6 0	31	23 $\frac{1}{2}$
Oystreham . . . .	9 38	21	16	Brehat . . . . .	5 51	31	23 $\frac{1}{2}$
Courseulles . . . .	9 7	20	15 $\frac{1}{2}$	Heaux de Brehat . .	5 45	31	23 $\frac{1}{2}$
Port-en-Bessin . . .	8 57	20	15 $\frac{1}{2}$	Tréguier . . . . .	5 32	25	18 $\frac{1}{2}$
St. Marcouf island .	9 55	20		Plougrescan . . . .	5 17	25 $\frac{1}{2}$	18 $\frac{3}{4}$
La Hougue . . . . .	8 42	18 $\frac{1}{2}$	14 $\frac{1}{2}$	Ploumanac'h . . . .	5 15	24 $\frac{1}{4}$	18 $\frac{1}{4}$
Barfleur . . . . .	8 51	17	13 $\frac{1}{2}$	Morlaix . . . . .	4 53	24	18
Cherbourg . . . . .	7 49	17	12 $\frac{3}{4}$	Roscoff . . . . .	4 46	23	17 $\frac{1}{4}$
Alderney, Braye } harbour . . . . . }	6 46	17 $\frac{1}{4}$	12 $\frac{3}{4}$	Ile de Bas . . . . .	4 49	23	17
Casquets . . . . .	6 45	15 $\frac{1}{2}$		Abervrac'h . . . . .	4 14	22	16
Guernsey, St. Peter- port . . . . . }	6 37	26	18 $\frac{3}{4}$	Ouessant . . . . .	3 32	19 $\frac{1}{4}$	13 $\frac{3}{4}$
				Conquet . . . . .	3 46	21	15
				Brest . . . . .	3 47	19	13 $\frac{1}{4}$
				Ile de Sein . . . . .	3 21	17 $\frac{1}{2}$	12



## TIDE SIGNALS.

In French ports, flood and ebb and the height of the tide are signalled at intervals by means of black balls, and by flags; these are hoisted on a mast crossed by a yard.

A ball at the intersection of the mast and yard (fig. 1) indicates a depth of 3 mètres,\* or 9 $\frac{3}{4}$  feet. Each ball *below* this, and in the line of the mast, represents an additional height of 1 mètre, or 3 $\frac{1}{4}$  feet,—but each ball *above* it, an additional height of 2 mètres, or 6 $\frac{1}{2}$  feet. A ball hoisted at the yard-arm and seen to the left of the mast, indicates 0·25 mètre or  $\frac{3}{4}$  of a foot additional, but seen to the right of the mast, 0·50 mètre, or 1 $\frac{3}{8}$  feet additional.

In order to show the state of the tide in respect to flood and ebb, a white flag crossed with black from corner to corner, and a black pennant will be used. One or both of these will be flying at the masthead so long as there are 2 mètres or 6 $\frac{1}{2}$  feet of water in the channel;—thus, the pennant above the flag indicates flood,—the flag alone, high water,—and the pennant below the flag, ebb.

The following woodcut represents the several positions of the balls on the mast or yard, corresponding to the depths indicated below.

Fig. 1.—3 mètres or 9 ft. 10 in.  
 Fig. 3.—3·50 mètres or 11 $\frac{1}{2}$  ft.  
 Fig. 5.—4 mètres or 13 ft. 1 in.  
 Fig. 7.—4·50 mètres or 14 $\frac{3}{4}$  ft.  
 Fig. 9.—5 mètres or 16 $\frac{1}{2}$  ft.  
 Fig. 11.—5·50 mètres or 18 ft.  
 Fig. 13.—6 mètres or 19 $\frac{3}{4}$  ft.  
 Fig. 15.—6·50 mètres or 21 $\frac{1}{2}$  ft.  
 Fig. 17.—7 mètres or 22 ft. 11 in.  
 Fig. 19.—7·50 mètres or 24 $\frac{3}{4}$  ft.  
 Fig. 21.—8 mètres or 26 $\frac{1}{4}$  ft.  
 Fig. 23.—8·50 mètres or 27 ft. 10 in.

Fig. 2.—3·25 mètres or 10 $\frac{3}{8}$  ft.  
 Fig. 4.—3·75 mètres or 12 $\frac{1}{8}$  ft.  
 Fig. 6.—4·25 mètres or 13 ft. 11 in.  
 Fig. 8.—4·75 mètres or 15 ft. 7 in.  
 Fig. 10.—5·25 mètres or 17 ft. 2 in.  
 Fig. 12.—5·75 mètres or 18 ft. 10 in.  
 Fig. 14.—6·25 mètres or 20 $\frac{1}{2}$  ft.  
 Fig. 16.—6·75 mètres or 22 ft. 2 in.  
 Fig. 18.—7·25 mètres or 23 $\frac{3}{4}$  ft.  
 Fig. 20.—7·75 mètres or 25 ft. 5 in.  
 Fig. 22.—8·25 mètres or 27 ft. 1 in.  
 Fig. 24.—8·75 mètres or 28 $\frac{3}{4}$  ft.

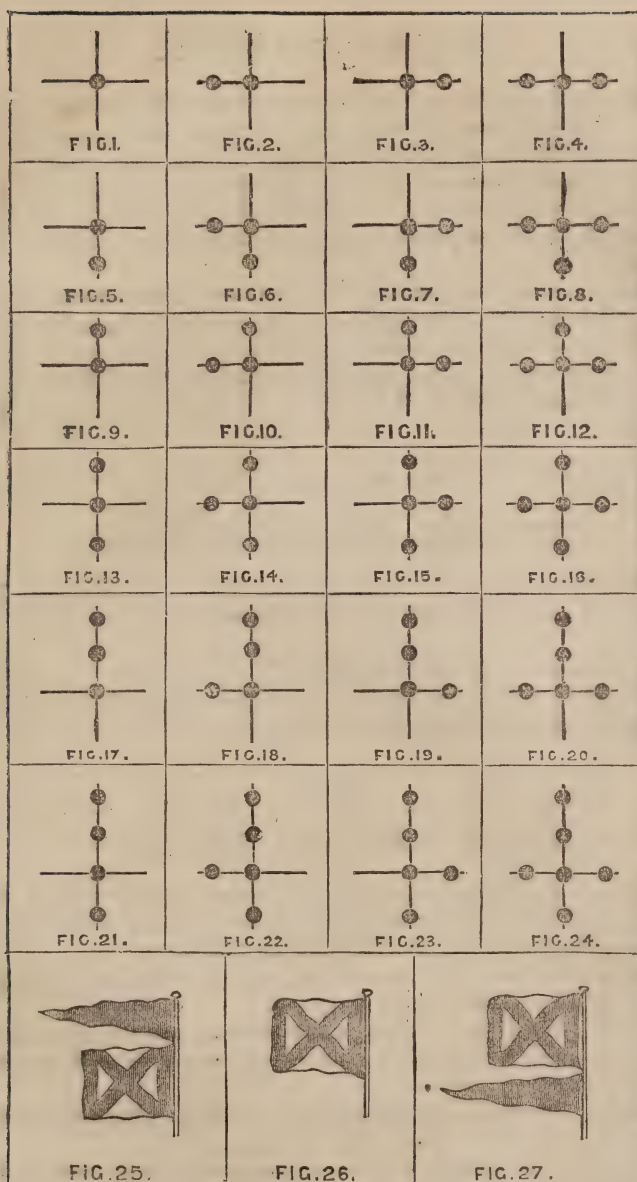
Fig. 25.—Pennant above flag,—“Tide flowing.”

Fig. 26.—Flag alone,—“High water.”

Fig. 27.—Pennant below flag,—“Tide ebbing.”

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\* A French mètre is equal to 39·3708 English inches.



A red flag at the masthead indicates that the state of the tide is such that a vessel cannot enter.

It must, however, be borne in mind that this system of signaling is not required *in its entirety* in every port; in some it is sufficient to indicate the rise and fall *mètre by mètre*; in others by every 2 *mètres*—hence, in these the mast has no yard. But whichever signal is hoisted, it invariably has the one meaning in every port.

## BEACONS AND BUOYS.

The following is the system of Buoys and Beacons on the coast of France :—

When entering a channel from sea all buoys and beacons painted *red* with *white band* near the summit must be left to starboard, and those painted *black* to port. That part of the beacon which is below the level of high water, and all warping buoys are coloured *white*. The small rocky heads in frequented channels are coloured in the same way as the beacons, when they have a surface sufficiently conspicuous.

Each beacon or buoy has upon it in full length or in abbreviation, the name of the danger it is meant to distinguish, likewise its number, commencing from seaward, and thus showing its numerical order in the same channel. The *even* numbers are on the red buoys, and the *odd* numbers on the black buoys ; the buoys and beacons coloured *red*, with *black horizontal bands* are named, not numbered.

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## GENERAL DANGER SIGNALS.

The following danger signals are shown at all harbours on the coast of France when the entrance is obstructed by a stranded vessel or by any other accident, viz. :—

During day a *red* flag on one of the jetties.

During night, a *red* light, and in those harbours where a light is established a second light is exhibited and both are of *red* colour.

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## LOCAL WEATHER SIGNALS.

The following local weather signals have been recently (August 1870) adopted at the principal ports and shipping places on the coast of France ; these have been arranged so that they do not clash with the tidal signals.

The *Cylinder* or *Drum*, when required, will remain hoisted for 36 hours, and indicates,—“ *Look out ; bad weather is expected.*”

The semaphores will announce to fishermen, morning and evening, or at whatever time during the day it may be necessary, *the state of the weather at sea*, by means of the following signals :—

1. A Flag, of any colour, indicates—Weather doubtful; barometer inclined to fall.
2. A short Pennant (*Cornet*) indicates—Appearance of bad weather ; heavy sea ; barometer falling.
3. A Pennant indicates—Appearance of better weather ; barometer rising.  
N.B.—With fine weather already set in, no signal will be made.
4. A Flag above *Cornet* indicates—The entrance of the port has become dangerous, be careful.
5. A *Cornet* above Flag indicates—The lifeboat is going out.



# GLOSSARY.

## FRENCH WORDS.

The following French words are of frequent occurrence on French Charts and in Sailing Directions.

A has the sound of *ah*; e of *a*; i of *e*; u of *oo*; ch of *sh*.

French.	English.	French.	English.
A pic ...	Perpendicular, bold, bluff.	Baril ...	Cask, barrel.
Abri ...	Shelter.	Barre ...	Bar.
Accul ...	Small bay.	Bas-se ...	Low.
Accores ...	Steep edges of a bank, or banks.	Basse mer ...	Low water.
Accore ...	Bold, steep.	Bassin ...	Basin.
Aiguade ...	Watering place.	Bateau de sauvetage ...	Life-boat.
Air de vent ...	Point of the compass.	Bateau-feu ...	Light-vessel.
Alisé or Alizé ...	Trade wind.	Beau, Belle ...	Fine, smooth, still.
Allumé ...	Lighted.	Bec, Becquet ...	Narrow precipitous point of land.
Amer ...	Sea-mark.	Blanc-he ...	White.
Amont ...	Up a stream.	Bleu-e ...	Blue.
Ancien-ne ...	Old, ancient.	Bocage ...	Grove, thicket.
Ancre ...	Anchor.	Bois ...	Wood.
Anse ...	Bight or cove.	Bon-ne ...	Good.
Arbre ...	Tree.	Bon vent ...	Fair wind.
Argile ...	Clay.	Bord ...	Edge, shore.
Arrière ...	Aft.	Boue ...	Sunken rock causing an overfall or breaker.
Atterage ...	Land-fall.	Bouée ...	Buoy.
Attention ...	Caution.	Bouée-cloche ...	Bell-buoy.
Auberge ...	Inn.	Bouée des sauvetage ...	Life-buoy.
Au-dessus ...	Above.	Bourrasques ...	Strong squalls.
Au-devant ...	Towards.	Boussole ...	Mariner's compass.
Au-dessus de ...	Over.	Bras ...	Arm.
Au-dessous ...	Beneath, under.	Brasse ...	= 5'33 or 5½ feet.
Au-vent ...	Windward.	Brisants ...	Breakers.
Automne ...	Autumn.	Brise ...	Breeze.
Aval ...	Down a stream.	Brisé ...	Broken.
Avant ...	Ahead.	Brouillard ...	Fog.
Avant-port ...	Outer port.	Brumeux ...	Foggy, wintry.
Aviso ...	Despatch boat.	Cabane ...	Cottage.
Babord ...	Starboard, or port.	Cable électrique ...	Telegraph cable.
Babord un peu ...	Port a little.	Calme ...	Calm.
Babord tout ...	Hard a port.		
Baie ...	Bay. [tide.		
Baisse ...	Rise and fall (of		
Balise ...	Beacon.		
Ballon ...	Globe, ball.		
Banc ...	Bank.		

French.	English.	French.	English.
Calme plat ...	Dead calm.	Detroit ...	Strait.
Campagne ...	Country (as opposed to town.	Devant ...	Before, ahead.
Canal ...	Channel, strait, canal.	Digue ...	Dyke, jetty.
Cap ...	Cape, headland.	Dôme ...	Dome.
Carrê ...	Square (as of a tower)	Douane ...	Custom-house.
Carte ...	Chart.	Dunes ...	Sand downs.
Chaîne ...	Chain (as of mountains or islands.)	Eau ...	Water.
Chaleur ...	Heat.	Eau douce ...	Fresh water.
Château-x ...	Castle, castles.	Echafaud ...	Staging.
Chaud-e ...	Hot.	Echoué ...	Wrecked, stranded, aground.
Chenal ...	Narrow channel.	Eclair ...	Lightning.
Ciel ...	Sky.	Eclaireux-se ...	Lightning around
Citadelle ...	Citadel.	Eclairage ...	Lighting—as of a coast or harbour.
Clair-e ...	Clear.	Eclipse ...	Eclipse (as of a light.)
Clapoteuse ...	Turbulent, very rough (as of the sea.)	Ecore ...	Precipice, steep.
Clapotis ...	Rippling.	Ecume ...	Foam, spray.
Cloche ...	Bell.	Ecueil ...	Dangerous rock, shoal, shelving rock.
Col ...	Neck or ridge connecting rocks with each other or with the mainland.	Eglise ...	Church.
Colline ...	Hill.	Embouchure ...	Mouth of a river
Colonne ...	Column, pillar.	En arrière ...	Behind.
Coquilles ...	Shells.	Endroit ...	Place, part.
Corail ...	Coral.	Entre ...	Between.
Corbière ...	Certain headlands have this prefix.	Entrée ...	Entrance.
Côte ...	Coast.	Epave ...	Wreckage.
Côté du vent ...	Weather side.	Escarpé ...	Steep, escarped.
Côte ferme ...	Mainland.	Est ...	East.
Côté sous le vent ...	Lee-side.	Etac ...	High, isolated rocks.
Coulé ...	Sunken wreck.	Etale, marée ...	Slack of tide.
Couleur ...	Colour.	étale ...	
Coup de vent ...	Heavy squall.	Été ...	Summer.
Courant ...	Current.	Faible ...	Light, slight.
Course ...	Course.	Falaise ...	Cliff.
Court-e ...	Short.	Falaise à pic ...	Steep cliff.
Couvert-e ...	Overcast.	Fanal ...	Lighthouse, lantern.
Cravan ...	Barnacle.	Fenêtre ...	Window
Crique ...	Creek, cove.	Fer ...	Iron.
Croix ...	Cross. [bank.	Feu, feux ...	Light, lights, fire.
Danger ...	Danger, rock or	Feu à éclats ...	Flashing light.
Débarquement ...	Landing-place.	Feu de port ...	Harbour light.
Dedans ...	Inside, within.	Feu fixe ...	Fixed light.
Dehors ...	Out, outside.	Feu fixe à éclats ...	Fixed and flashing light.
Demi-e ...	Half.	Feu tournant ...	Revolving light.
Demies ...	Half-tide rocks.	Fin-e ...	Fine.
Demi-flot ...	Half-flood.	Flamme ...	Pennant.
Dérive ...	Leeway.	Flot ...	Flood tide.
Dernier ...	Last.	Fond ...	Bottom, ground, depth.
		Forêt ...	Forest.
		Fort ...	Fort.
		Fort-e ...	Strong, much.

French.		English.	French.		English.
Fourquie	...	Forked rock, or with two heads.	Malsaine	...	Unsafe. [hill.
Frais, fraîche	...	Fresh.	Mamelon	...	A rounded, steep
Froid-e	...	Cold.	Marais	...	Marsh, swamp.
Galet	...	Shingle.	Marche	...	Headway.
Golfe	...	Gulf.	Marché	...	Market.
Grains	...	Squalls, squally.	Marée	...	Tide.
Grand-e	...	Great, large, much.	Mât	...	Mast.
Gravier	...	Gravel, pebbles.	Matin, Matinée	...	Morning.
Grêle	...	Hail.	Mauvais-e	...	Bad.
Grève	...	Beach.	Melé	...	Mixed.
Gris	...	Gray.	Mer	...	Sea.
Gros	...	Coarse, heavy.	Mer houleuse	...	Heavy sea.
Groupe	...	Group (as of islands, &c.)	Méridional	...	Southern.
Grune	...	Rocks with a flat top.	Mètre	...	= 3' 28 or 3¼ feet.
Guidon	...	Cornet or broad pennant.	Mol, mou, molle...	...	Soft, yielding.
Habitacle	...	Binnacle.	Montagne	...	Mountain.
Haut-e	...	High.	Morne	...	Hillock, bluff, mountain.
Hauteur	...	Height.	Mouillage	...	Anchorage.
Haut-fond	...	Shoal.	Moulière	...	Rock where mus-
Havre	...	Harbour.			sels are found.
Herbier	...	Weed.	Moulin à vent	...	Windmill.
Hiver	...	Winter.	Moye, Moie	...	Steep rocky pro-
Hivernage	...	Winter; the wet and stormy season as opposed to the dry and fine season, between the tropics.			montory.
Houle	...	Swell, rollers.	Naufrage	...	Shipwreck.
Houmet or hom-	...	Low islets near met the shore.	Nébuleux-se	...	Misty, hazy, ob-
Humide	...	Damp.			scure.
Ile	...	Island.	Neige, Neigeux	...	Snow, snowy.
Ilot	...	Isle.	Neuf, neuve	...	New.
Intense	...	Intense.	Niveau	...	Level.
Jaune	...	Yellow.	Noir-e	...	Black.
Jour	...	Day.	Nord	...	North.
Jussant	...	Ebb. [rocks.	Nouveau, nouvelle	...	New.
Kaines	...	Long reefs of	Nuages, Nuageux	...	Clouds, cloudy.
Lac	...	Lake.	Nuit	...	Night.
Lame courte	...	A short sea.	Occidental	...	Western.
Lames	...	Waves, billows.	Orage	...	Storm.
Lanterne	...	Lantern.	Orageux	...	Stormy.
Large	...	Offing.	Oriental	...	Eastern.
Largeur	...	Width, breadth.	Ouest	...	West.
Leger-e	...	Light.	Ouragan	...	Hurricane.
Lest	...	Ballast.	Passe	...	Narrow channel, gat, fairway of channel.
Lieu	...	Place.			
Lit	...	Bed.	Pays	...	Country.
Long-ue	...	Long.	Petit-e	...	Little.
Longueur	...	Length.	Peuple	...	People.
Madrepore	...	Madrepore, coral.	Phare	...	Lighthouse.
Magnetique	...	Magnetic.	Pierre	...	Stone.
Maison	...	House.	Pieu	...	Lamp-post.
			Pilote	...	Pilot.
			Pilotis	...	Piles.
			Plage	...	Beach.
			Plat-e	...	Flat, level.
			Plein-e	...	Full, main.
			Pleinmont or Plémont	...	Bluff headland.
			Pluie	...	Rain.
			Pluvieux-se	...	Rainy.
			Point	...	Point (of depar- ture).



French.		English.	French.		English.
Pointe	...	Point (as of land), headland.	Tombé	...	Fallen (as of the sea or wind).
Pont	...	Bridge.	Tonnant	...	Thundery.
Port	...	Port, harbour.	Tonne	...	Beacon-buoy.
Poteau	...	Post.	Tonnerre	...	Thunder.
Presqu'île	...	Peninsula.	Tribord	...	Starboard.
Promontoire	...	Promontory.	Tour	...	Tower.
Quai	...	Quay.	Tour-balise	...	Beacon-tower.
Quarantaine	...	Quarantine.	Tourbillion	...	Whirlwind.
Quart	...	Quarter (as of compass, &c.)	Tourelle	...	Small tower, turret, tower shaped beacon.
Rade	...	Roadstead.	Très	...	Very, excessively.
Ras de mer	...	Tide rips.	Trombe	...	Water-spout.
Récif	...	Reef, ridge.	Trompette de brouillard	...	Fog trumpet.
Relèvement	...	Bearing.	Vague	...	Wave.
Remorqueur	...	Tug-boat.	Vapeur (à-)	...	Steam.
Rhumb	...	Rhumb-line or course.	Vasard	...	Oozy.
Rivage	...	Bank (of a river), shore (of sea).	Vase	...	Mud, ooze.
Rivière	...	River.	Vent	...	Wind.
Rocher	...	Rock.	Vent arrière or vent en poupe	...	A wind right aft, or astern.
Rond-e	...	Round, circular.	Vent contraire	...	A foul wind.
Rose	...	Compass-card and needle,	Vent d'amont	...	Land wind.
Rouge	...	Red.	Vent d'aval	...	Sea wind, wind from the offing.
Route	...	Course.	Vent de bouline...	...	A scant wind (occasioning a vessel to be close hauled.)
Routier	...	Sailing directions, directory.	Vent debout	...	A scant wind.
Rue	...	Street.	Vent de quartier	...	Wind upon the beam.
Ruines	...	Ruins.	Vent de terre	...	Land-wind.
Sable	...	Sand, sand-glass.	Vent devant	...	Head wind.
Saline	...	Saltish, Salt-marsh.	Vent du large	...	Sea-breeze.
Sain-e	...	Safe.	Vent frais	...	A fresh gale of wind.
Saute de vent	...	Sudden veering of the wind.	Vent largue	...	Free wind.
Sauvement	{	Salvage.	Vent maniable	...	Moderate wind, favourable for sailing.
Sauvetage	{		Vents alisés	...	Trade winds.
Sec-he	...	Dry. [dry.	Vers	...	Towards.
Sèche	...	Rock or sand left	Vert-e	...	Green.
Septentrional	...	Northern.	Vieux, vieille	...	Old.
Serein-e	...	Serene, settled.	Vigie	...	Hidden rocks, or single rock in open sea.
Sifflet de brume...	...	Fog whistle.	Village	...	Village.
Signal	...	Signal.	Ville	...	Town, city.
Sillage	...	Headway.	Vivres	...	Fresh provisions.
Sombre	...	Gloomy, dark.	Vrais	...	True.
Sonde	...	Soundings.	Vue	...	View.
Sous le vent	...	Leeward.			
Sud	...	South.			
Tempestueux-se...	...	Tempestuous.			
Tempête	...	Tempest.			
Temps	...	Weather.			
Temps forcé	...	Stress of weather.			
Terre	...	Land.			
Terre ferme	...	Mainland.			

# THE MARINER'S COMPASS IN FRENCH AND ENGLISH.

French.	English.
Nord.	North.
N. q. N.E., or N. $\frac{1}{4}$ N.E.	N. by E.
N.N.E.	N.N.E.
N.E. q. N., or N.E. $\frac{1}{4}$ N.	N.E. by N.
N.E.	N.E.
N.E. q. E., or N.E. $\frac{1}{4}$ E.	N.E. by E.
E.N.E.	E.N.E.
E. q. N.E., or E. $\frac{1}{4}$ N.E.	E. by N.
Est.	East.
E. q. S.E., or E. $\frac{1}{4}$ S.E.	E. by S.
E.S.E.	E.S.E.
S.E. q. E., or S.E. $\frac{1}{4}$ E.	S.E. by E.
S.E.	S.E.
S.E. q. S., or S.E. $\frac{1}{4}$ S.	S.E. by S.
S.S.E.	S.S.E.
S. q. S.E., or S. $\frac{1}{4}$ S.E.	S. by E.
Sud.	South.
S. q. S.O., or S. $\frac{1}{4}$ S.O.	S. by W.
S.S.O.	S.S.W.
S.O. q. S., or S.O. $\frac{1}{4}$ S.	S.W. by S.
S.O.	S.W.
S.O. q. O., or S.O. $\frac{1}{4}$ O.	S.W. by W.
O.S.O.	W.S.W.
O. q. S.O., or O. $\frac{1}{4}$ S.O.	W. by S.
Ouest.	West.
O. q. N.O., or O. $\frac{1}{4}$ N.O.	W. by N.
O.N.O.	W.N.W.
N.O. q. O., or N.O. $\frac{1}{4}$ O.	N.W. by W.
N.O.	N.W.
N.O. q. N., or N.O. $\frac{1}{4}$ N.	N.W. by N.
N.N.O.	N.N.W.
N. q. N.O., or N. $\frac{1}{4}$ N.O.	N. by W.

In the French Mariner's Compass, q. stands for *quart*, a quarter—which is also written  $\frac{1}{4}$ ;—thus, in the French N. q. (or  $\frac{1}{4}$ ) N.E., stands for Nord quart au Nord-Est, (North a quarter towards North-East), which is equivalent to our N. by E.

## REGULATIONS

### FOR

## PREVENTING COLLISIONS AT SEA.

Art. 1.—In the following Rules, every steamship which is under sail and not under steam is to be considered a sailing ship; and every steamship which is under steam, whether under sail or not, is to be considered a ship under steam.

### RULES CONCERNING LIGHTS.

Art. 2.—**Lights.**—The Lights mentioned in the following Articles numbered 3, 4, 5, 6, 7, 8, and 9, and no others, shall be carried in all weathers from sunset to sunrise.

Art. 3.—**Lights for Steamships.**—Sea-going steamships, when under way, shall carry—

(a) AT THE FOREMAST HEAD, a bright *white* light, so fixed as to show a uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the light 10 points on each side of the ship, viz., from right ahead to 2 points abaft the beam on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 5 miles.

(b) ON THE STARBOARD SIDE, a *green* light, so constructed as to throw a uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles.

(c) ON THE PORT SIDE, a *red* light, so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles.

(d) The said *green and red side lights* shall be fitted with inboard screens, projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

Art. 4.—**Lights for Steam-tugs.**—Steamships, when towing other ships, shall carry *two bright white mast-head lights vertically, in addition to their side lights*, so as to distinguish them from other steamships. Each of these mast-head lights shall be of the same construction and character as the mast-head lights which other steamships are required to carry.

Art. 5.—**Lights for Sailing-ships.**—Sailing-ships, under way, or being towed, shall carry the same lights as steamships under way, with the exception of the white mast-head lights, which they shall never carry.

Art. 6.—**Exceptional Lights for small Sailing-vessels.**—Whenever, as in the case of small vessels during bad weather, the green and red lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition; and shall, on the approach of, or to, other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in



such manner as to make them most visible, and so that the green light shall not be seen on the port side, nor the red light on the starboard side.

To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with suitable screens.

**Art. 7.—Lights for Ships at Anchor.**—Ships, whether steamships or sailing-ships, *when at anchor in roadsteads or fairways*, shall exhibit, where it can best be seen, but at a height not exceeding 20 feet above the hull, *a white light, in a globular lantern of 8 inches in diameter*, and so constructed as to show a clear uniform and unbroken light, visible all round the horizon at a distance of at least one mile.

**Art. 8.—Lights for Pilot Vessels.**—Sailing pilot vessels shall not carry the lights required for other sailing vessels, but shall carry *a white light at the mast-head*, visible all round the horizon; and shall also exhibit a flare-up light every 15 minutes.

**Art. 9.—Lights for Fishing Vessels and Boats.**—Open fishing boats and other open boats shall not be required to carry the side lights required for other vessels; but shall, if they do not carry such lights, carry *a lantern having a green slide on the one side and a red slide on the other side*; and on the approach of, or to, other vessels, such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side, nor the red light on the starboard side.

Fishing vessels and open boats, when at anchor, or attached to their nets and stationary, *shall exhibit a bright white light*.

Fishing vessels and open boats shall, however, not be prevented from using a *flare-up* in addition, if considered expedient.

## RULES CONCERNING FOG SIGNALS.

**Art. 10.—Fog Signals.**—Whenever there is a fog, whether by day or night, the fog signals described below shall be carried and used, and shall be sounded at least every 5 minutes, viz. :—

(a) Steamships under way shall use a *steam whistle*, placed before the funnel, not less than 8 feet from the deck.

(b) Sailing-ships under way shall use a *fog-horn*.

(c) Steamships and sailing-ships, when not under way, shall use a *bell*.

## STEERING AND SAILING RULES.

**Art. 11.—Two Sailing-ships meeting.**—If two sailing-ships are *meeting end on, or nearly end on*, so as to involve risk of collision, the helms of both shall be put to port, so that each may pass on the port side of the other. (See note at foot of next page.)

**Art. 12.—Two Sailing-Ships crossing.**—When two sailing-ships are *crossing, so as to involve risk of collision*, then, if they have the wind on different sides, the ship with the wind on the port side shall keep out of the way of the ship with the wind on the starboard side; except in the case in which the ship with the wind on the port side is close-hauled and the other ship free, in which case the latter ship shall keep out of the way; but if they have the wind on the same side, or if one of them has the wind aft, the ship which is to windward shall keep out of the way of the ship which is to leeward.

**Art. 13.—Two Ships under Steam meeting.**—If two ships under steam are meeting *end on*, or *nearly end on*, so as to involve risk of collision, the helms of both shall be put to port, so that each may pass on the port side of the other.\*

**Art. 14.—Two Ships under Steam crossing.**—If two ships under steam *are crossing*, so as to involve risk of collision, the ship which has the other on her own starboard side shall keep out of the way of the other.

**Art. 15.—Sailing Ship and Ship under Steam.**—If two ships, one of which is a sailing-ship and the other a steamship, are proceeding in such directions as to involve risk of collision, the steamship shall keep out of the way of the sailing ship.

**Art. 16.—Ships under Steam to slacken speed.**—Every steamship, when approaching another ship so as to involve risk of collision, shall slacken her speed, or, if necessary, stop and reverse; and every steamship shall, when in a fog, go at a moderate speed.

**Art. 17.—Vessels overtaking other Vessels.**—Every vessel overtaking any other vessel, shall keep out of the way of the said last-mentioned vessel.

**Art. 18.—CONSTRUCTION OF ARTICLES 12, 14, 15, and 17.**—Where, by the above Rules, one of two ships is to keep out of the way, the other shall keep her course, subject to the qualifications contained in the following Article.

**Art. 19.—PROVISO TO SAVE SPECIAL CASES.**—In obeying and construing these Rules, due regard must be had to all dangers of navigation; and due regard must also be had to any special circumstances which may exist in any particular case rendering a departure from the above Rules necessary in order to avoid immediate danger.

**Art. 20.—NO SHIP UNDER ANY CIRCUMSTANCES TO NEGLECT PROPER PRECAUTIONS.**—Nothing in these Rules shall exonerate any ship, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

\* *Caution.*—Whereas there has been doubt and misapprehension concerning the effect of the two Articles 11 and 13.

The said two articles only apply to cases where ships are meeting end on, or nearly end on, *in such a manner as to involve risk of collision*. They consequently do not apply to two ships which must, if both keep on their respective courses, pass clear of each other.

The only cases in which the said two articles apply, are, when each of the two ships is end on, or nearly end on, to the other; in other words, to cases in which, *by day*, each ship sees the masts of the other in a line, or nearly in a line, with her own; and, *by night*, to cases in which each ship is in such a position as to see both the side-lights of the other.

The said two articles do not apply, *by day*, to cases in which a ship sees another *ahead* crossing her own course; or, *by night*, to cases where the red light of one ship is opposed to the red light of the other; or where the green light of one ship is opposed to the green light of the other; or where a red light without a green light, or a green light without a red light, is seen ahead; or where both green and red lights are seen anywhere but ahead.—*London Gazette, Aug. 4th, 1868.*

SAILING DIRECTIONS  
FOR THE  
SOUTH AND SOUTH-WEST COASTS  
OF  
IRELAND,  
FROM  
CARNSORE POINT TO THE RIVER SHANNON.

COMPILED CHIEFLY FROM RECENT SURVEYS.



LONDON, E.:  
JAMES IMRAY AND SON,  
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1871.

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ESTABLISHED 1763.



\* \* COMMUNICATIONS FOR THE FUTURE IMPROVEMENT OF THIS OR ANY OF  
\* \* OUR PUBLICATIONS ARE RESPECTFULLY REQUESTED, AND WILL BE  
GRATEFULLY ACKNOWLEDGED.

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# LIGHTS.

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		PAGE
Tuskar rock . . . . .	{ <i>Revolves in 2 minutes</i> (showing two <i>white</i> faces and one <i>red</i> , alternately),—visible 15 miles . . . . .	1
Saltees <i>lightvessel</i> . . . . .	Two <i>fixed</i> lights,—visible 8 and 10 miles . . . . .	3
Waterford (Hook point) . . . . .	<i>Fixed</i> ,—visible 16 miles . . . . .	4
Dunmore . . . . .	{ <i>Fixed</i> ( <i>red</i> to seaward, <i>white</i> to the northward of the pier),—visible 5 miles . . . . .	4
Waterford harbour . . . . .	{ Two <i>fixed</i> lights at Duncannon fort,—each visible 10 miles; a <i>fixed</i> light $\frac{1}{2}$ mile N.N.E. $\frac{3}{4}$ E. from Duncannon fort,—visible 16 miles; and a small <i>red</i> light on the spit off Passage point . . . . .	5
Dungarvan . . . . .	{ <i>Fixed</i> ( <i>green</i> between East and S.E. by E., and <i>red</i> in the direction of the Carrickapane rock),— <i>white</i> light visible 10 miles . . . . .	7
Mine head . . . . .	{ <i>Intermittent</i> (bright 50 seconds, eclipsed 10 seconds),—visible 21 miles . . . . .	7
Youghal . . . . .	A small <i>red</i> light . . . . .	8
Ballycottin island . . . . .	<i>Flashes</i> every 10 seconds,—visible 18 miles . . . . .	8
Roche point . . . . .	{ <i>Revolves</i> ( <i>red</i> ) in <i>one minute</i> ,—visible 10 miles. A <i>fixed</i> light is also shown from the base of the tower, to cover Daunt rock . . . . .	9
Cork harbour . . . . .	{ On Haulbowline spit is a <i>fixed red</i> light,—visible 5 miles. Small lights are also shown at the following places:— <i>red</i> at lough Mahon; <i>green</i> at Donkathel; <i>white</i> at Black Rock castle; <i>red</i> on the navigation wall at King's quay; and <i>red</i> at Tivoli . . . . .	10
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Kinsale harbour . . . . .	<i>Fixed</i> ,—visible 14 miles . . . . .	12
Fastnet . . . . .	<i>Revolves</i> in 2 <i>minutes</i> ,—visible 18 miles . . . . .	21
Crookhaven . . . . .	{ <i>Fixed</i> ,—visible 13 miles; shows <i>red</i> in the direction of Alderman rock and Streek head . . . . .	23
Bantry bay . . . . .	<i>Fixed</i> ,—visible 12 miles . . . . .	25
Calf rock . . . . .	<i>Flashes</i> every 15 <i>seconds</i> ,—visible 17 miles . . . . .	28
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Valentia . . . . .	<i>Fixed</i> ,—visible 12 miles . . . . .	32
Tearaght rock . . . . .	<i>Revolves</i> in $1\frac{1}{2}$ <i>minutes</i> ,—visible 22 miles . . . . .	34
Tralee bay . . . . .	{ <i>Fixed</i> ,—visible 9 miles; shows <i>red</i> to seaward between the bearings of N. $\frac{1}{4}$ E. westward to W. by N. $\frac{1}{2}$ N. ( $73^{\circ}$ ) . . . . .	36
Loop head . . . . .	{ <i>Intermittent</i> (bright 20 seconds and eclipsed 4 seconds),—visible 22 miles . . . . .	36



# SAILING DIRECTIONS

FOR THE

## SOUTH AND SOUTH WEST COASTS

OF

# IRELAND.

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\* \* \* *The Bearings and Courses throughout this Work are Magnetic, unless otherwise expressed.*

*The Variation at present (1871) is 23° 40' W. off Carnsore Point ; 24° 30' W. at Cork harbour ; 24° 56' W. off Cape Clear ; and 26° 20' W. at Valentia. It is estimated to decrease 6' annually.*

*The Distances are in Nautical Miles,—60 to a Degree of Latitude.*

*A Cable is considered to be  $\frac{1}{10}$  of a Nautical Mile, and equal to 100 Fathoms.*

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### CARNSORE POINT TO CAPE CLEAR.

**CARNSORE POINT**, the south-east extremity of Ireland, bears from cape Cornwall, N. by E. easterly, about 126 miles; from the Smalls lighthouse, N.N.W.,  $37\frac{1}{2}$  miles; and from St. David's head in Wales, N.W., 42 miles.

**Tuskar Rock** lies nearly E.  $\frac{1}{2}$  S.,  $6\frac{1}{4}$  miles from the extremity of Carnsore point, and is a remarkable rock, 15 feet above the level of the sea, appearing somewhat similar to a vessel bottom up. About a mile south-westward from the rock is a dangerous patch of 9 feet, known as the *South rock*, which must be carefully avoided by vessels approaching from southward. The soundings for about a mile all round the Tuskar vary from 7 to 18 fathoms, but further out the water deepens, and a vessel will be in 36 fathoms when the light bears W. by N. 2 miles off.

The lighthouse on the rock is 110 feet high, and shows a light *revolving in two minutes*. The lantern is fitted with a shade of red glass, which gives out a red glare every 6 minutes; this lantern is 101 feet above the sea, and the light can be seen from a distance of 15 miles; it is shown over the horizon (360°). The position of the lighthouse is lat. 52° 12' 9" N., long. 6° 12' 21" W. A bell is tolled every half-minute during foggy weather. In connexion with the lighthouse there is a telegraph, forming a signal of communication with the Irish coast.

Nearly midway between the Tuskar and the main, is a narrow sand of  $5\frac{1}{4}$  to 8 fathoms, called the *Baillies prong*, the south end of which,  $7\frac{3}{4}$  fathoms, lies W.  $\frac{1}{4}$  S. from the rock, and E.S.E.  $\frac{1}{4}$  S. from Carnsore point. It thence extends in a north-easterly direction about 4 miles, and joins the rocky shoals extending from Greenore point. Between this sand and the Tuskar are soundings of 15 to 23 and 12 fathoms, and between it and the shore, 15 to 22 fathoms.

**SALTEES ROCKS, &c.**—Westward of Carnsore point are the Saltees, Barrels, and other dangers, amongst which it would be imprudent to sail if unacquainted, or unaccompanied by a pilot. About 8 miles W.  $\frac{1}{4}$  N. from the Tuskar, and 2 miles W.  $\frac{1}{4}$  S. from Carnsore point, is a rock always above water, known as the *Black rock*, and a little north of it is another named the *Tercheen*. Close to these rocks are soundings of 5 to 7 fathoms, and vessels may occasionally anchor between them and the shore in 10 and 11 fathoms, but care is required on account of some shallow patches which lie about, especially the *Nether*, a patch of 16 feet situated nearly one-third the distance from Black rock towards Carnsore point.

The *Barrels*, nearly a mile south-eastward of the Black rock, consist of two small rocks, which are covered at  $2\frac{1}{2}$  hours' flood; the *Nether rock* is half a mile due North from them. A conical black buoy, with the words "Barrels Rock" in white letters on it, marks the Barrels rock. It lies in 15 fathoms at low water springs,  $1\frac{1}{2}$  cables S.  $\frac{1}{4}$  E. from the rock with Black rock in one with castle ruins; Tuskar lighthouse bearing E.  $\frac{1}{4}$  N. distant  $7\frac{1}{2}$  miles; and the beacon on North Saltee island W. by N.  $\frac{1}{2}$  N.,  $7\frac{1}{2}$  miles. To go southward of the Barrels, when sailing westward, keep Greenore point open of Carnsore point, until Black rock bears N.  $\frac{1}{2}$  W., or until it is on with Ballysekin castle; then steer W. by S. and pass southward of the Saltees lightvessel. It will be prudent always to keep at least  $1\frac{1}{2}$  miles southward of the Black rock.

From Carnsore point the coast takes a westerly curve towards Crossfarnoge point, a distance of  $8\frac{1}{2}$  miles, for the first 5 of which the water shoals pretty gradually; a bank named the *Kilturk* then commences, and runs out from the shore  $1\frac{1}{2}$  miles, to the depth of 5 fathoms. Besides this bank, there are, eastward of the Saltees, and distant from them from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  miles, four patches of  $2\frac{1}{2}$ , 3, 4, and  $4\frac{1}{2}$  fathoms respectively. The outermost, named the *Bore* (18 feet), lies with the extremity of Carnsore point just open northward of the Black rock, and may be cleared on the western side by bringing Sleive Coiltia mountain on with the south-west point of the North Saltee, N. by W.  $\frac{2}{3}$  W.

A little south-eastward of Crossfarnoge point is *Kilmore spit* and *St. Patrick's bridge*, a narrow ridge of stones which stretches out in a curve to two rocky islands called the Saltees, and has over it at low water from 2 to 8 feet. The *Little* or *North Saltee* lies about 2 miles from the land, and bears from Ballyteige castle S.S.W. At half a mile northward of the south-west point of the Little Saltee, there is a small rock, with only 3 feet on it at low water; and about a cable S.W. from the same point of the island, there is another small rock, which appears at half-ebb: and nearly one mile N.W. by N. from the point is the *Jackeen rock*, with a shoal patch a short distance northward from it. There are also rocky shoals extending northwards, about a quarter of a mile from the Great Saltee, on the shoalest part of which are 6 feet water.

The *Great Saltee* is separated from the Little Saltee by a channel half a mile wide, in which are from 2 to 4 fathoms water; off its north-west end, vessels may anchor in 5 and 6 fathoms. From the north-east point of the Great Saltee, Carnsore point bears E.  $\frac{1}{2}$  S., distant  $9\frac{1}{2}$  miles. Off the southern side of the Great Saltee lie the *Brandy rocks*, which cover at  $\frac{1}{3}$  flood, and are distant from the island  $1\frac{1}{2}$  miles; to pass eastward, and between them and the Bore, bring Sleive Coiltia mountain open north of the Great Saltee, bearing N. by W.  $\frac{1}{2}$  W., westerly.

At  $1\frac{1}{4}$  miles S.S.W.  $\frac{1}{4}$  W. from the south-west end of the Great Saltee is the *Coningmore rock*, which is 11 feet above high water, and has close around it 14 and 16 fathoms. Another rock, the *Coningbeg*, lies  $1\frac{1}{4}$  miles S.W. by W.  $\frac{1}{2}$  W. from the Coningmore, and S.W. (westerly),  $2\frac{1}{2}$  miles from the Great Saltee; it is under water, covering at 4 hours' flood, and has 25 fathoms immediately off it on the south side:—to clear it on its east side, bring the Coningmore rock in one with the west end of the Great

Saltee, N.N.E.  $\frac{1}{4}$  E.; on its west side, Ballyteige castle open of the west end of the Great Saltee, N.E.; and on its south side Tory hill open south of Baginbun tower situated on the west side of Bannow bay, N. by W.  $\frac{3}{4}$  W.; any of these marks will clear the Coningbeg, but it is most prudent to give the rock a much wider berth by passing at least  $1\frac{1}{2}$  miles southward of it.

At about a mile N.  $\frac{3}{4}$  W. from the Coningbeg rock, and  $1\frac{1}{2}$  miles W.N.W. from the Coningmore rock, is a patch of  $4\frac{1}{2}$  fathoms named *Red bank*, which has soundings around it of 8 to 14 fathoms. To clear it on the west side, bring the west edge of the Little Saltee open north of the Great Saltee, E.N.E.  $\frac{3}{4}$  E.; and on the south side, Tory hill N. by W.  $\frac{3}{4}$  W.

As a general summary of the marks for sailing among the Saltees rocks, it may be observed that when the Coningmore rock comes in one with the middle of the opening between the Great and Little Saltees, a vessel will be eastward of the Coningbeg rock; and that when the sound is quite shut in, or the Little Saltee island is hidden behind the large island, a vessel will be westward of the rock. To sail westward of the whole group of dangers, including the Jackeen rock, bring Ballyteige castle in one with the west rocks of Crossfarnoge, bearing N.E. by E.  $\frac{1}{3}$  E., and a depth of 15 to 8 fathoms will be maintained. To sail eastward of the Brandy rocks, and between them and the Bore, bring the castle of Ballyteige open eastward of the Little Saltee island; to clear them on the south side, bring Coningmore rock to bear N.W. by W.  $\frac{1}{2}$  W.; and to clear them on the west side, bring Ballyteige castle a little open of the western end of the Little Saltee, or what is nearly the same thing, bring Forth mountain in one with the west edge of the Little Saltee, bearing N.E. by N.  $\frac{1}{4}$  N. If compelled to pass between the Saltee islands, keep nearer to Little Saltee than to Great Saltee, and use the utmost caution.

*Saltees lightvessel*.—It is intended to place a lighthouse on the Coningbeg rock, the southernmost danger of the Saltees, and until that intention is carried into effect, a lightvessel will remain moored southward of the rock. This vessel is placed in 32 fathoms water, S.W.-ward 4 miles from the Great Saltee, and W.  $\frac{1}{2}$  S. from the Tuskar, distant 19 miles. It carries two *fixed* lights, upon separate masts, which are visible 10 or 8 miles, according to the state of the weather. In foggy or dark weather, and snow showers, a gong is sounded both night and day.

N.W.  $\frac{1}{3}$  W.,  $5\frac{1}{2}$  miles from Crossfarnoge point are the Keragh or Bannow isles; they are small and two in number, with some rocks about them, and situated nearly a mile from the main. About  $1\frac{1}{2}$  miles E.N.E. from these is the bar of Loch, a small narrow opening leading to a large inlet of shallow water, of no use to shipping. The space from this bar to Crossfarnoge point is named Ballyteige bay; here, from half-flood to half-ebb on the shore, the stream runs eastward, and from half-ebb to half-flood the contrary.

**Bannow Bay**.—Westward of the Saltees about 7 miles is Bannow bay, having in its northern part Bannow inlet, which is too shallow for any but small vessels. In the middle of the entrance is an islet, having on its western side the passage into the inlet, in which passage there are 6 to 8 feet at low water.

*Fethard* is a little harbour outside the entrance to Bannow inlet on its western side; it is only fit for small vessels, as there is a depth of but 8 feet between the pier-heads at high-water spring tides. A rocky ledge runs eastward from the point about 2 cables, which may be avoided by keeping an old castle at the south end of Fethard trees in one with the quay-head. At about half a mile eastward from the entrance of Fethard creek, there is a rocky shore, on which there are only 4 feet at low water.

At about a mile southward of Ingard point, the east point of the entrance to Fethard harbour, is Baginbun point, having on it a tower useful as a mark for clearing the



Saltees rocks. At  $1\frac{1}{4}$  miles eastward of this tower is a patch of  $4\frac{3}{4}$  fathoms, with soundings about it of 7 to 8 fathoms.

The *Bridge of Brecaun* is a narrow rocky ledge, which extends from the shore about  $\frac{3}{4}$  of a mile to the S. by E. from the point next northward of Slade harbour; there is a depth of 2 feet on it at low water. To avoid this shoal, keep any part of the mountain of Forth, above Wexford, open of, or without Baginbun head; this mark, however, leads very close to the reef.

*Slade bay* is foul and rocky; it is about a mile north-eastward of the Hook point of Waterford, and to the S.W. of Brecaun bridge; the pier becomes dry at low water, and the depth is not more than 12 feet at spring-tides. However, in westerly or northerly winds, vessels may anchor in about 5 fathoms sandy bottom, by bringing Slade castle and the pier-head in one, opposite the stone wall, which is a short distance from the shore.

**WATERFORD.**—Upon Hook point (the eastern side of entrance to the harbour) stands a tower 115 feet high, from which a *fixed* light is exhibited, visible in clear weather about 16 miles; it illuminates an arc of about  $294^\circ$  (from N.N.E.  $\frac{1}{4}$  E. westward and southward to East). The tower is white, with three horizontal red belts painted on it; the lantern dome is red. Bells are tolled in foggy weather.

Waterford harbour, at its entrance, is more than 2 miles wide. Further in, on its western side, is Credan head, a remarkable promontory, the extremity of which bears N. by E.  $3\frac{1}{4}$  miles from Hook point. At rather more than two miles southward from Credan head is the little harbour of Dunmore, where a *fixed* light is shown on the extremity of the pier, on the south side of the harbour;—this light is *red* to seaward, and *white* to the interior of the harbour; it is not visible when descending the river until abreast of Credan head. The arc illuminated is from S. by E.  $\frac{1}{2}$  E. eastward to E. by N. ( $84^\circ$ ).

From Dunmore harbour some packets sail for Milford haven. These lie afloat at all times with good shelter; the pier affords a secure anchorage with westerly gales, as well as from the prodigious sea which rolls along the southern coast, but it is not adapted for an asylum harbour, from its spaces being very confined, and its want of depth, there being only one spot within the pier-head with more than 14 feet, 9 to 12 feet being the ordinary depth at low water. The pier-head is in 4 fathoms water at low spring tides, and a vessel may stop at a cable's length north of it in 3 fathoms, secure from all but southerly winds.

From Credan head to Duncannon fort, on the opposite side, the bearing and distance are N.E.  $\frac{3}{4}$  N.,  $2\frac{1}{2}$  miles. At about a mile northward of Credan head, there is a bar across the harbour, composed of loose shingle, which has with northerly winds only 13 feet water upon it; but with southerly winds the water rises to 26 feet; at low spring ebbs there are only 12 feet.\* This bar is connected with an extensive shelf, which stretches off from the coast on each side. The north-eastern part of the shelf, on the western side, is called Drumroe bank; it extends more than a mile from the shore, and narrows the passage abreast Duncannon fort to about a cable's length;—upon its edge there are 2 fathoms water, and in the channel there are 8 fathoms;—the bank thence trends to the north-westward, in a direction nearly parallel with the opposite shore until it joins Passage strand, the shelf extending south-eastward from Passage point, upon the extremity of which is a perch beacon.

A dangerous shelf, called the Ballistraw spit, lies on the eastern side of the harbour

\* The most shallow parts of the bar are marked by buoys, two *red* being on the western side, and a *black* buoy on the eastern side of the channel; the passage into the harbour is consequently between the buoys.

southward of Duncannon fort ; it extends about a mile from Fort point in a S.S.W.  $\frac{1}{2}$  W. direction. Another shelf, named *Seedes bank*, having only 10 feet at low water on its edge, stretches half over the river, between Ballyhack, which is about  $1\frac{3}{4}$  miles above Duncannon fort, on the eastern side, and Buttermilk point. Another shoal, but smaller, and having the same depth of water, extends from the opposite side, just above Buttermilk castle, to the distance of about  $1\frac{1}{2}$  cables.

Duncannon fort exhibits two *fixed* lights in one tower ; the arc of illumination is from S.S.W. westward to S.W. by S. ( $11^{\circ}$ ). The building is white, and the lights being 53 feet above the sea may be seen in fine weather at 10 miles off.

A lighthouse also stands on the eastern side of Waterford harbour, in a N.N.E.  $\frac{3}{4}$  E. direction from Duncannon Fort lighthouse, distant  $5\frac{1}{2}$  cables. The tower is circular, white, and exhibits a *fixed* light, at 128 feet above the sea, visible about 16 miles ; the arc illuminated is  $22^{\circ}$  (from S.W.  $\frac{1}{2}$  S. southward to S. by W.  $\frac{1}{2}$  W).\*

The distance from Duncannon fort to Passage point is 2 miles, and thence to Cheek point, at the entrance of Suir river, is nearly the same distance ; here the river divides, one branch taking a northerly direction to New Ross, and named Barrow river, the other running westerly to the city of Waterford.

*Directions.*—Vessels from southward, or from eastward bound to Waterford, should keep Sleanaman mountain (a remarkable mountain, inland) N.E. until the Hook lighthouse, on the east side of the entrance, comes in sight.† Hook point should not be approached nearer than 3 or 4 cables, in order to avoid falling into the irregular streams of tide that set round it. When past the Hook, and intending to proceed for the anchorage at Passage, take a flood-tide, or leading wind, and steer for Credan head, give it a berth of about a cable, then steer for Duncannon fort, which is on the opposite side, about  $2\frac{1}{2}$  miles N.E.  $\frac{3}{4}$  N. from Credan head. The two Duncannon lighthouses in one lead in the best channel across the bar.

Between Broomhill point and Duncannon fort is Ballistraw bay. The sand on the opposite side is called Drumroe bank ; it extends more than a mile from the shore, and narrows the passage abreast Duncannon fort to about a cable. The deepest water is towards the starboard shore. Between the bar and Duncannon fort are from  $2\frac{1}{2}$  to 9 fathoms ; the deepest water is nearly abreast the lights. When above the lights, keep near the eastern side, steering about N.  $\frac{1}{2}$  E. for the church of Ballyhack, until the perch on the upper end of Drumroe bank comes into view, to which give a good berth. When abreast of this perch, the depth is 6 or 7 fathoms in the middle of the channel, thence steer upwards in mid-channel for the usual anchoring-place, which is about a mile above Passage town, in 5 or 6 fathoms.

There is a very good anchorage 2 or 3 miles above Passage, where the stream is much weaker than at Passage. In proceeding for this place, avoid the before-mentioned spit of sand, which runs off about W.S.W. from the point of Buttermilk castle, and extends about half-way over to the opposite side ; the least water on this spit is 9 feet. Avoid also a small bank which lies about 2 cables from the shore, on the south side of Cheek point,—the least water on this bank is 9 feet,—at half-tide 14 feet. If proceeding at about the time of low water, the shoal will be cleared by keeping midway between the two points, or rather nearer to Buttermilk point ; or if the flood tide be running, keep

\* In addition to the lights at Duncannon fort and lighthouse, a small *red* light is shown from a pile lighthouse on the spit off Passage point.

† It should be remembered that the entrance to Waterford harbour is marked on its eastern side by the Hook lighthouse, a *single* conspicuous tower ; but the entrance to Tramore bay, the next inlet westward, is distinguished by *two* towers on Brownstown head, its eastern point, and by *three* towers on Newton head, its western point. The dangerous indraught of Tramore bay should likewise be borne in mind. (See page 6.)

in the rough part of the stream. Such vessels as do not draw above 10 or 11 feet water may go up to the town of Waterford; the safest channel is on the north side of Little island. The channel on the other side has deeper water, but it is narrow and winding, and subject to eddy tides, which make it both difficult and dangerous.

**New Ross.**—At Cheek point the river Suir is met by the river Barrow, which comes from the northward, and is navigable for large vessels as far as the town of New Ross, where are numerous corn mills and lime works. Thence there is communication by means of barges with the town of Athy.

**Tramore Bay, &c.**—About half-way between Dunmore bay in Waterford harbour, and Brownstown head, the east point of Tramore bay, is Swine point, having at a short distance off it some dangerous rocks, named the *Falskirt rocks*, which cover at two-thirds flood. These rocks are steep, there being 36 to 53 feet water immediately off them: but they may be avoided by not going into less than 12 or 11 fathoms, or by not approaching the coast to less than three-quarters or half a mile.

Tramore bay is about  $4\frac{1}{2}$  miles westward of Waterford, and is  $2\frac{1}{4}$  miles wide, with soundings shoaling gradually from 10 fathoms at the entrance. The bay is dangerous, so that it must always be carefully avoided, more especially as many serious accidents have resulted in consequence of its being mistaken for Waterford entrance. It is notorious for shipwrecks, and in hazy weather, or when the Hook tower cannot be seen, should be carefully shunned. Southerly winds, when they blow hard, bring a very heavy sea into the bay, and the flood-tide sets in with great velocity towards Rinnashark harbour, which operating jointly, render it almost impossible for a ship so caught in the bay to get out again by plying to windward; added to which, the ground is very foul and rocky. When ships happen to be thus forced on shore, the north-western part of the bay is the only place where there is any possibility of saving either their crews or cargoes. The east side of the bay is so shoal and full of rocks, that such ships as are unfortunately forced on that side, get involved with terrible breakers at a considerable distance from the shore.

On the eastern side of Tramore bay is the small harbour of Rinnashark, accessible for small vessels, provided they have a pilot. There are 9 or 10 feet water in the shallowest part of the channel at half-ebb, but the channel is narrow, and there is considerable danger of getting aground on the point of the sand which lies at the entrance; no stranger ought to attempt to go in, unless he finds himself under an absolute necessity for so doing. In that case he should endeavour to have four hours' flood, and to keep within a cable of the starboard shore, notwithstanding the appearance of the breakers on that side, until he has got nearly a mile up, when the water will be smoother, and the channel more distinguishable. If any vessel be so unfortunate as to be embayed here, when the winds blow so hard as to render it impossible for them to extricate themselves, their running on shore anywhere near the west side of the bay, rather than attempting the harbour, will afford the best means of saving the lives of those on board.

Three towers stand on Newton head, the western boundary of Tramore bay, and two on Brownstown head, its eastern boundary, by which the bay may readily be distinguished from the entrance to Waterford, or from any other part of the coast. On the central tower on Newton head is the herculean figure of a man, with one arm pointing towards Hook lighthouse, which forms an object too remarkable to be mistaken.\*

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\* Many instances, it seems, are on record of the entrance of Tramore bay being mistaken, in thick weather, for that of Waterford; I cannot, however, discover the least resemblance between Newton head and the land eastward of Brownstown, or in any way imagine how such a mistake can ever have arisen.—*Captain Martin White, R.N.*



**DUNGARVAN.**—The south side of the entrance to Dungarvan bay, known as Helvick head, lies about W. by N.  $\frac{1}{4}$  N. 23 miles from Hook point (Waterford harbour). In the harbour northward of the head, vessels drawing not more than 10 feet water may have good shelter, and lie on clean sand when left by the tide; but vessels drawing 10 feet should not go in until it is nearly high water with a spring tide. In the shoalest part of the channel there are 3 feet at low water. At the quay there are 9 feet at high water spring tides, and 7 feet with neap tides, and at a short distance from the quay there are 2 or 3 feet more water.

During day, in order to fall in with Dungarvan bay, keep Cruach hill, the westernmost and most tapering of the Dungarvan mountains, bearing N.  $\frac{1}{4}$  E. In the mouth of the bay are two rocks above water, the largest of which lies nearly in the middle, and is called *Carrickapane*;—there is a passage on each side of this rock, if care be taken to give it a berth of half a cable. From the other rock a ledge extends to the shore of Ballinacourty. A rock, named *Gainers*, lies about half a mile northward of Helvick head; it extends about a quarter of a mile from east to west, and has, with ordinary spring tides, about 2 feet on it at low water;—in order to avoid it, on the north side, keep within 2 cables of Carrickapane; or give Helvick head a berth of about two-thirds of the distance between it and Carrickapane.

The best place to wait for the tide to go up to Dungarvan is off the house of Ballinacourty, at about half a cable from the shore, because there the ground is best for holding. About half flood (vessels should not attempt to proceed before), steer for Ballinacourty point, and when near the house, keep about half a cable from shore.

**Lights.**—On Ballinacourty point, on the northern side of the entrance channel, is a lighthouse which shows a *fixed* light from East southward to N.W.  $\frac{3}{4}$  N. ( $233^{\circ}$ ). Between East and S.E. by E. it is *green*; towards the Carrickapane rock it is *red*; in all other directions it is *white*. In clear weather the white light, being 58 feet above the level of the sea, may be seen at the distance of 10 miles. The tower is circular, of a light grey limestone, and 44 feet in height from the base to the top of the ball over the dome, and bears from Helvick head N.  $\frac{1}{2}$  E.  $1\frac{1}{2}$  miles. Mine Head light, 4 miles S.W. by W. from Helvick head, marks the approach from westward to Dungarvan bay, and is seen further eastward than the range of Dungarvan light. When entering Dungarvan bay at night, keep clear of the *red* light to avoid Carrickapane rock, and southward of the *green* light to avoid Carrignagaddy and Carricknamoan (rocks which extend half a mile eastward from Ballinacourty point).

**Mine Head Light.**—The lantern of Mine Head lighthouse is 285 feet above the sea level. The light is *intermittent*, appearing bright during 50 seconds, and obscured during the remaining 10 seconds; it is visible from a distance of 21 miles, and is shown over an arc of  $188^{\circ}$  (from E. by N.  $\frac{1}{2}$  N. southward to W.  $\frac{3}{4}$  S.) It bears from Hook lighthouse, W. by N.  $25\frac{1}{2}$  miles; Coningbeg rock W. by N.  $\frac{3}{4}$  N.  $35\frac{3}{4}$  miles; Capel island, south point, E.  $\frac{1}{2}$  N. 12 miles; Ballycottin island lighthouse, E.  $\frac{1}{2}$  N.  $17\frac{3}{4}$  miles; and Old head of Kinsale, south point, E.  $\frac{1}{2}$  N.  $42\frac{1}{2}$  miles.

**YOUGHAL HARBOUR** lies about  $13\frac{1}{2}$  miles westward from the entrance of Dungarvan, and will admit vessels drawing not more than 10 or 12 feet water, which may ride always afloat, off the middle of the town. Across the mouth of the harbour there is a bank of sand, or bar, extending about a mile southward from the entrance, having no more than 4 feet water on it. On this bar the sea is always rough when the wind blows on shore, or against tide; there is a depth of about 13 feet on it at high water neap tides. When Capel island bears W.S.W.  $\frac{1}{2}$  S. the vessel is on the outer edge of the bar. When proceeding for Youghal bay from southward, keep Knockmealdown mountain N. by E. When necessary to anchor, to wait the tide for going over the bar, the best places for that purpose are:—on the south side of the harbour, with the

harbour's mouth bearing N.N.E. in 3 or 4 fathoms; off Whiting bay in 5 or 6 fathoms; or on the north side of Capel island in 4 or 5 fathoms, about 2 cables from the shore.

On the western side of the entrance to Youghal harbour is a lighthouse, consisting of a circular tower of a light stone colour. The lantern is 78 feet above high water level; the light, *fixed*, is shown from N.  $\frac{1}{2}$  E. eastward to S.W. by S. ( $208^\circ$ ) and can be seen from a distance of 6 miles. It bears from Black rocks, east point, N.E.  $\frac{3}{4}$  E.,  $2\frac{3}{4}$  miles; Capel island, east point, N.E. by N.,  $3\frac{5}{8}$  miles; Bar rocks, S.W. point, N. by E.  $\frac{1}{2}$  E.,  $1\frac{1}{2}$  miles; Blackball ledge, N.E. point, N. by W.  $\frac{3}{4}$  W.,  $1\frac{1}{2}$  miles; Blackball head, N.W.  $\frac{1}{4}$  W.,  $\frac{7}{8}$  mile; and from Ferry point, S.W.  $\frac{3}{4}$  S.,  $\frac{3}{4}$  mile.\*

**Ballycottin Islands.**—These islands lie 6 miles W.  $\frac{3}{4}$  S. from Capel island. In the middle of the sound, between the two Ballycottin islands, there is a small rock, named *Sound*, which dries with very low spring ebbs. About  $1\frac{1}{2}$  miles W.  $\frac{3}{4}$  S. from Ballycottin islands there is another small rock (marked by a *black* beacon buoy), called *Smith's*, which dries at low spring ebbs only;—a vessel will just avoid this rock on the south side by keeping more than half a mile from the shore, or by keeping Capel island open eastward of Ballycottin islands, E.  $\frac{3}{4}$  N. North-westward of the Smith's is the *Wheat rock*, situated on the extremity of a spit running from the shore, and drying at 4 hours' ebb.

*Light.*—On the outer Ballycottin island is a lighthouse, consisting of a circular stone-coloured tower, the projecting gallery and blocking under the lantern being coloured red. The building is 50 feet high, and shows a *flashing* light at an elevation of 195 feet above the sea, visible 18 to 20 miles; the arc illuminated is from E.  $\frac{1}{2}$  N. seaward to W.  $\frac{1}{2}$  N. ( $191\frac{1}{2}^\circ$ ). The flashes appear at intervals of 10 seconds. From the lighthouse, Mine Head light bears E.  $\frac{1}{2}$  N.  $17\frac{3}{4}$  miles; Capel island, south point, E.  $\frac{3}{4}$  N., 6 miles; Smith's rock, W.  $\frac{3}{4}$  S.,  $1\frac{1}{2}$  miles; and Old head of Kinsale, W.  $\frac{3}{8}$  S.,  $24\frac{1}{2}$  miles. A bell is sounded during fogs.

Northward of Ballycottin islands is Ballycottin bay, which is said to possess some advantages. Lieut. Samuel Colston, R.N., states, 23rd June, 1843, that "the bay is not sufficiently known, and is very erroneously considered as dangerous, an opinion which cannot be too soon removed. Three years' observation has convinced me that the mercantile interest has, in many instances, suffered, in consequence of vessels when bound to Cork, or ports westward, and obliged to bear up by westerly gales, instead of taking shelter under the high western land of this bay, having run for the dangerous bar harbour of Youghal, or even further eastward, thereby risking their safety in attempting Youghal, and possibly otherwise causing loss and delay to owners, whereas by taking this bay they would not only have been within 2 or 3 hours' communication with Cork by land, and about 10 miles distant from the harbour's mouth, but ready to take advantage of the first favourable change.

The only disadvantage of this anchorage is, that the wind setting in from S.E. to E. (which wind, however, very seldom blows) renders it necessary for vessels to put to sea as quickly as possible.

The prevailing winds on this coast are westerly throughout the year; therefore this anchorage is safe and convenient, with the wind from S.W. to N. by E.

Vessels taking shelter here from a westerly gale should anchor with the Government houses bearing S.S.W. to S.W., and the outer island S.E. to S.S.E. in about 3 fathoms low water. The bottom is smooth and even, of fine sand and clay, perfectly clean, and good holding-ground.

\* A red light is exhibited from a window of Youghal light tower 2 hours before high water till  $1\frac{1}{2}$  hours after high water. The arc illuminated is  $18^\circ$  (S.W. by S. to S. by W.  $\frac{1}{2}$  W.).

The outside island is high, with a bold rocky coast, steep-to, with deep water, and no dangers, so that any vessel, in taking the bay from the westward, may round the island close-to, and find herself suddenly in smooth water.

A vessel attempting the sound (between the Ballycottins) should keep the south-east island close aboard, as there is a dangerous reef of rocks, which shows at low water, extending from the N.E. point of the inner island, running out E.S.E. to about mid-channel. The depth of water through the sound is from 5 to 7 fathoms."\*

From Ballycotton islands the coast runs westerly. At about 7 or 8 miles from these islands, in a W.  $\frac{1}{2}$  N. direction, is Poor head, and about 3 miles N.W. by W. from this point is Roche point, on the east side of the entrance to Cork harbour.

**CORK.**—This is one of the finest harbours on the coast of Ireland, and it is capable of accommodating almost any number of vessels. It has a deep and narrow entrance, through which the largest ships may enter at any time, without regard to the tide. Within, the harbour expands into a magnificent basin, interspersed with islands, and being land-locked, the greatest protection is afforded to vessels riding in the roadstead. Ships of the largest class come close to the quays at Queenstown, where the anchorage is excellent; and, indeed, it is almost impossible to imagine a finer harbour. The entrance is guarded by forts Camden and Carlisle;† and the harbour is further protected by fortifications on Spike and Haulbowline, two small islands opposite Queens-town.

The course from the Land's End to the entrance of Cork harbour is N. by W.  $\frac{1}{2}$  W., 46 leagues; from St. Anne's lights, Milford haven, N.W. by W.  $\frac{1}{2}$  W., 39 $\frac{1}{2}$  leagues; and from the north end of Lundy island, N.W.  $\frac{1}{4}$  W., 46 leagues. In proceeding for this harbour, from the southward, look out for Knockmealdown hill, which has been before described, and having brought it to bear N.E. by N., keep on with this bearing until the Old head of Kinsale appears, which is about 15 miles W. by S.  $\frac{1}{2}$  S. from the entrance of Cork harbour, and is readily distinguished, being a bluff headland with a lighthouse on it.

*Light.*—On Roche point is a lighthouse 49 feet high, which shows a *red* light revolving every minute at 98 feet above the sea, visible 10 miles; the arc illuminated is from N. by E. westward to S.E. (237°). A *fixed white* light is also shown from the base of the tower, between the bearings from it of S.W. by W. and S.W.  $\frac{1}{2}$  S. (17°) to cover Daunt rock. In order to keep vessels to the eastward of Daunt rock, the *red revolving* light should be kept in sight until the vicinity of the rock has been passed. A fog bell at the lighthouse is sounded eight times in a minute.

Roche point bears from Poor head N.W. by W., distant 3 miles, and from Cork head, N.E. by E., distant 3 $\frac{1}{2}$  miles. When off the harbour, Roche Point lighthouse will readily point out your situation. Some rocks named the Cow and Calf lie a little outside of Roche point.‡

Cork harbour is very extensive, easy of access, and will afford shelter to vessels of any size, against all winds that blow; the ground too is good for holding, and the depths of water throughout vary from 4 to 14 fathoms. The anchorage in the harbour may properly be divided into the inner and outer, the former being northward of the Spit bank, and the latter eastward of it. The first affords a secure station for the refitting

\* This must be at high water, for the Admiralty Surveyors found as little as 3 fathoms at low water between the outer island and Sound rock; the channel between the inner island and Sound rock has but 2 $\frac{1}{2}$  fathoms. Springs rise 13, and neaps 6 feet.

† Prince Rupert's tower, in Carlisle fort, has been demolished; it is consequently no longer available as a clearing mark for Daunt's rock.

‡ The mark to sail westward of the Cow and Calf rocks is, the tower on Haulbowline island in one with the outer face of Camden fort.



and equipment of vessels; the second is merely used as a temporary roadstead. The spit alluded to is a mixture of sand, shingle, and mud, stretching more than a mile from Haulbowline island, with a degree of convexity in an easterly direction, its northern edge being parallel to the shore of Queenstown.

From the entrance of the harbour and up to the anchorage off Queenstown, the fairway is marked by buoys, *red* on the western side of the channel and *black* on the eastern side.

The principal dangers to be apprehended in entering the harbour are, the Harbour rock and the Turbot bank, which lie directly in the fairway of the entrance;—of these the *Harbour rock* is the outermost. The latter bears from Roche Point lighthouse N.W.  $\frac{1}{2}$  N., distant  $3\frac{1}{2}$  cables, and has only 14 feet upon it at low water spring tide. On its eastern end is a red and white beacon buoy, and a black and white buoy also marks its western side.

At  $\frac{1}{3}$  of a mile from the Harbour rock, in the direction of N.N.E., lies the south end of the *Turbot rock*, which extends thence in a westerly direction about 2 cables. The shoalest water is 18 feet. The eastern side of this rock is marked by a red and white beacon buoy, and the western side by a black and white buoy.

*Harbour Lights.*—On the N.E. point of Haulbowline spit is a lighthouse, the light of which is elevated 32 feet above the level of high-water spring tides; it is a *fixed red* light, shown between the bearings from it of S.S.W.  $\frac{1}{2}$  W. eastward to N.W. by W.  $\frac{1}{2}$  W. ( $270^\circ$ ). The building is placed in a depth of 9 feet at low water, and is based on screw piles, forming with the bracing an open framing, coloured red. The superstructure or dwelling is of an octagonal form, and painted of a light grey colour. Caution is required not to cross the bank between the lighthouse and Haulbowline island, and to give the lighthouse a sufficient berth in passing. The bearings of the lighthouse are as follow:—From Turbot rock, east side, N. by E.  $\frac{1}{2}$  E.,  $2\frac{7}{10}$  miles; from Roche Point lighthouse, N. by E.  $\frac{1}{8}$  E.,  $3\frac{1}{5}$  miles; from the white buoy, eastward of Spike island, N. by E.  $\frac{1}{8}$  E.,  $6\frac{1}{2}$  cables; from Bar rock, north end, S.W.  $2\frac{1}{2}$  cables; from Middle Spit buoy, S.E.  $\frac{1}{8}$  E.,  $4\frac{1}{2}$  cables; and from Queenstown Custom House quay, east end, S.S.E.  $\frac{3}{4}$  E.,  $6\frac{1}{2}$  cables. Small lights for local purposes are also shown at the following places:—*red* (and fog-bell) at Lough Mahon; *green* at Donkathel; *white* at Black rock castle; *red* on the navigation wall at King's quay; and *red* at Tivoli.

The ship channel into Queenstown harbour is very much straitened by the steep flats before described, no part thereof exceeding in breadth the distance between forts Carlisle and Camden, whence it winds circuitously between the buoys, narrowing at the same time as you proceed northerly, so that no one leading mark can be taken up and acted upon continuously from the harbour's mouth; though by attention to the buoys and to the lead, a vessel may be worked in or out at any time. The best channel for large ships is eastward of the Harbour rock and Turbot bank, as at low-water spring tides there is no continuous deep water westward of those shoals for any vessel drawing more than 23 feet.

When beating into or out of Cork harbour, it is requisite to know that the tide of flood sets, in the first instance, into the bight between Dog Nose and Roche point, and thence obliquely across towards Crosshaven, where it is again warped into a north-easterly direction, which produces corresponding counter-tides and eddies along both shores. The tide of ebb has a directly opposite tendency. It is high water at Queens-town on full and change days at 5h. 1m., and the tide rises with ordinary springs 11 feet 9 inches, and neaps 9 feet. Roche point, as well as Dog Nose, is bold, so also is the western shore, as far up as the Turbot bank.

The above instructions will suffice for the navigation of the harbour, supposing the

buoys to be at their stations; but should they not be it will be more prudent to take a pilot than to attempt to run up without one. At present the ship channel is well defined by buoys; the western limits of the channel, as already stated, being pointed out by *red* buoys, and the eastern limits by *black* buoys, most of which are in not less than 4 fathoms water.

The small creek or inlet known as *Crosshaven*, within the entrance of Cork harbour, is formed by Gorabinnah hill on the northern side, and the land on which Camden fort stands on the southern side. The channel into it is so very narrow and circuitous, that no leading marks can be given; it has from 8 to 13 feet water, and is the resort of coasters and other small vessels, which frequent it at proper periods of tide.

**Daunt Rock.**—At three-quarters of a mile from Robert head is Daunt rock, on the shoalest part of which there are not more than 10 feet water, although on other parts there are 24 and 30 feet, and close to it on all sides 8 fathoms. This rock trends nearly in an E.N.E. and W.S.W. direction, and is, including the rocky ground which surrounds it, about one-sixth of a mile in length, and one-eighth in breadth. It lies nearly in the fairway of vessels passing between Cork and Kinsale, and is the more dangerous as it seldom breaks unless under a heavy swell. A buoy has been placed off the east side of this rock; it is painted black, with a white head, and has the words "Daunt rock" upon it.\* A patch with 22 feet water upon it is situated about  $\frac{2}{3}$  of a mile from Reanie's head, and one mile S.W.  $\frac{1}{2}$  W. from Robert head; this should be remembered when using the channel between Robert head and Daunt rock. There is also an 18-foot shoal  $\frac{1}{4}$  mile southward of Flat head.

**Oyster Haven** is about six miles north-eastward from the Old head of Kinsale, and has at the entrance two huge craggy rocks, called the Great and Little Sovereign islands. Although it presents an inviting entrance, it is merely a creek or inlet of the sea, and will not afford any shelter with the wind from between South and West to vessels drawing more than 8 feet water, and these must occasionally lie aground; these winds also send in so heavy a sea as to render riding in the harbour's mouth actually impracticable, although the depth there is from 17 to 25 feet. Vessels may pass with perfect safety on either side of the Great Sovereign by giving it a berth of 2 cables.

**KINSALE.**—Southward of Kinsale harbour is the Old head, which is generally the first land met with when approaching the harbour from westward after rounding cape Clear. It is easily distinguished by the ruins of Baron de Courcy's castle, two towers of which are all that are visible from seaward. The lighthouse, which is white and has two red belts painted on it, is 100 feet high, and shows a *fixed* light at the height of 236 feet above the sea, visible about 22 miles; the arc illuminated is from N.E.  $\frac{1}{4}$  N. southward to N.W. by N. ( $284^{\circ}$ ). In the direction of the outer part of Courtmacsherry bay, from N.W. by W.  $\frac{1}{4}$  W. to W.  $\frac{3}{4}$  N. ( $22\frac{1}{2}^{\circ}$ ), the light is *red*; the bay is full of rocks.

If viewed in any direction eastward of N.E., or westward of N.N.W., the Old head presents a long projecting bluff appearance, with a deep bight on each side; that on its west side being Courtmacsherry bay, and that on its east side Kinsale harbour. In

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\* In order still further to mark Daunt rock a bell-boat buoy has been moored in 12 fathoms, at 120 fathoms S.S.W. from it, with the telegraph tower on Roche point in one with the peak of a distant mountain bearing N.E.  $\frac{1}{4}$  E., and the gable end of the white house in Robert cove just open of the north-east side of entrance to the cove, N.  $\frac{1}{4}$  E. It is shaped like a boat, and is surmounted by a triangular superstructure of angle-iron and lattice-work, which is coloured black, with the words "Daunt Rock" in white letters upon it. The ball on the top of the superstructure is 24 feet above the sea.

order to fall in with the head, when coming from the offing, keep Knockmealdown hill N.E. by E. Between Kinsale Old head and Galley head, 16 miles westward from it, are the Seven heads, on which there is a square signal tower.

Kinsale harbour, though narrow at its entrance and all the way up to the town, is nevertheless very safe, and capable of receiving vessels of any size. The entrance (formed by Hangman point on the eastern, and Money point on the western side) is about four miles from the pitch of the Old head of Kinsale, in the direction of N.E. After rounding Bream rock, which lies under the eastern side of the Old head, with 7 fathoms close to it, steer for the harbour's mouth by keeping the whole of Charles fort, an extensive castellated building considerably within the harbour's mouth, open westward of Hangman point, and minding not to bring the said fort within its own apparent breadth of Money point on the port hand; and having reached well within the former point, keep as near mid-channel as possible, and anchor until a pilot is obtained. Cove anchorage is that generally resorted to, as it affords very good shelter even with the wind right in; it lies a little within or to the north-westward of Charles fort, and about  $1\frac{1}{2}$  cables from the shore. There is, however, water enough for the largest ships close up to the town of Kinsale, the channel to which lies close along the northern shore, but it is very narrow and circuitous, and renders the assistance of a pilot necessary. The wind between S.S.W. and E.S.E. is a free wind in, and from W.N.W. to N.E. a fair wind out.

There is a bar of coarse sand a little southward of Charles fort, having 10 to 15 feet on it at low water spring tides. Vessels are within or to the northward of this bar when the body of Charles fort bears E.S.E.  $\frac{1}{2}$  E., and drop thence almost immediately into 5 or 6 fathoms. The dangers in going into Kinsale harbour are Farmer ledge on the west side, and Bulman rock on the east side. The former lies close to the shore, and uncovers 2 feet at low water. The latter lies above 2 cables southward of Hangman point, and has only 3 feet on it at low water: it is steep, and is marked by a buoy off it, lying in about 10 fathoms water. By keeping Charles fort wholly open (as above directed) westward of Hangman point, vessels will pass considerably westward of the Bulman, and by not bringing the said fort within its own apparent breadth of Money point, they will avoid the Farmer ledge.

A *fixed* light in Charles fort is 98 feet above high water; it is shown from S.S.W.  $\frac{1}{2}$  W. westward to S.W.  $\frac{1}{2}$  S. (about  $12^{\circ}$ ). When running for the harbour in a very dark night, some caution is necessary, as there are no guides but this light and that on the Old head to lead to the Narrows, at the entrance of the harbour, and as the mouth of the harbour is not in a direct line between these two beacons, it is in that case very difficult for a stranger to hit. Under these circumstances, it is recommended to maintain an offing until daylight, or till a pilot can be procured, unless pressed by circumstances. The water between the Old head and the mouth of the harbour shoals gradually from 20 to 7 fathoms—the latter depth is between the two points. By keeping the southernmost Sovereign island twice its own apparent breadth open to the southward of Frower point, vessels will pass to the southward of the Bulman; and the middle of the said island in one with Frower point will lead between the Bulman and the land. There is anchorage anywhere under the Old head outside the harbour's mouth as long as Charles fort is in sight eastward of Money point, in from 7 to 14 fathoms water; here the ground is tolerably good, and there is shelter against the wind when between West round northerly to N.N.E. Should the wind veer to the southward, it will be fair for entering the harbour.

A little westward of Kinsale harbour is a small inlet named *Sandy cove*, in which are from 2 to 4 fathoms, but in consequence of its entrance being much contracted it can only be used by coasters and hookers. The south side of the cove is formed by



Sandy Cove island, a small islet, the western end of which is joined to the shore by rocky ledges.

**Courtmacsherry Bay.**—From the Old head of Kinsale, the bearing and distance to the Seven heads are W. by N. about  $6\frac{3}{4}$  miles. Between is Courtmacsherry bay, within which are several rocks and shoals, rendering it an unsafe place for a stranger. Near the middle of the bay are the *Barrels*; the southernmost, which is the smallest, dries at low water,—this rock lies with the lighthouse on the Old head of Kinsale S.E.  $\frac{2}{3}$  E., and has a perch on it. The largest rock lies half a mile northward of the other, and is uncovered with spring ebbs only.

Within the Inner Barrel rocks is a patch of  $2\frac{3}{4}$  fathoms, known as the *Breen rock*, which lies nearly half a mile from the shore, and has 4 and 7 fathoms close to it; vessels may clear it on the south side, and also sail between it and the Inner Barrels, by bringing the extreme low points of Land point and Coolmain point, the points forming the entrance to Courtmacsherry harbour, in one, bearing N.W.  $\frac{1}{2}$  W. A pinnacle rock, named *Blue Boy*, also lies nearly  $\frac{1}{3}$  of a mile S.E. by E.  $\frac{3}{4}$  E. from the Outer Barrels, and has only 2 feet on it at low-water spring-tides; and another rock named *Black Tom*, with only 9 feet on it, lies rather more than half a mile westward from the perch, and has 7 to 8 fathoms close to it. Vessels may clear the Black Tom on the western side, by bringing the top of Burren hill to bear N. by W.  $\frac{1}{2}$  W., when it will be well shut in by Land point; and on the south side, by bringing the western house of Lislee village in one with the church, and just open north of Horse rock, about N.W.  $\frac{3}{4}$  W., which mark will also lead southward of the Outer Barrel and Blue Boy rocks in a depth of 9 to 10 fathoms.

On the western side of Courtmacsherry bay is the *Horse rock*, lying a quarter of a mile off Barry point; it is just awash at high-water spring tides, but at low water exhibits a considerable surface. This rock is so steep, that it may be approached to within a ship's length, and within, between it and the shore, is a passage of 8 fathoms water, through which vessels may sail by bringing Harbour View house to appear midway between the rock and Barry point.

Northward of Barry point, is *Broadstrand bay*, a well sheltered anchorage and stopping-place during westerly winds, where is anchorage in 4 fathoms on a fine sandy bottom. It is said that good anchorage, in 7 fathoms, can also be obtained off the coast-guard station in *Seven Heads bay*, south-westward of Barry point; but this position is somewhat exposed.

Commander Wolfe, R.N., says:—"Courtmacsherry harbour is not adapted to vessels of large size, yet had it formerly been better known, many lives and much valuable property might have been saved. The entrance to the harbour may be distinguished by a well-defined point, the southernmost of the harbour, called Land point, over which stands a sort of summer-house or turret of an octagonal form.

In approaching, keep the conical hill of Burren, on the north side of the harbour, shut well behind Land point, and bearing about N. by W.  $\frac{3}{4}$  W., which will lead nearly a quarter of a mile westward of the Black Tom rock. The water shoals gradually up to the above point, which should be rounded very closely, and the southern shore kept on board; this shore is high and rocky, but the opposite side is formed of sand-hills. The first bar runs off from Land point, carrying 10 feet at low-water springs, and on which, with S.E. winds, the sea breaks very heavily. Within this bar there is another with 9 feet on it, but which, from being sheltered from the heave of the swell, a vessel can generally insure passing at the same height of tide that will admit the outer bar to be crossed.

A quarter of a mile within Land point there is a hole with 15 feet at low water, in which a ship of heavy burden may ride safely, by anchoring about two-thirds over

towards the northern shore, and steadying her with a kedge to the southward. From this spot to the quays at the village the channel is narrow, winding, and varying in depth from 7 to 12 feet at low water. The village of Courtmacsherry lies a mile within the entrance of the harbour; it is a small poor village, with no trade beyond a few small coasting-vessels, and affording no supplies. Above the village the harbour expands to a considerable area of mud and sand, drying at low water, and extending 2 miles up to the village of Timoleague, which is little better than Courtmacsherry, and to which no vessels but hookers ever go.

It is high water at Courtmacsherry harbour at full and change, at 4 hrs. 36 min.; spring tides rise 11 feet, and neap tides 9 feet: at spring tides the stream is very strong.

**Seven Heads.**—This is a bold, bluff headland, having on its extremity an old telegraph tower, which is 134 feet above the sea. Immediately off the headland are 10 to 14 fathoms; but the shore should not be approached too closely, on account of the rocky ledges at its base, which uncover at low water. On the east side of the headland is the *Cotton rock*, which uncovers at low water, and at about half a mile further off, there is a bank of 6 to 9 fathoms, named *Baun*, upon which the sea breaks in heavy weather; close to this shoal on the east side are 10 to 16 fathoms water, and between it and the shore are 10 to 13 fathoms.

**Clonakilty Bay.**—This bay is on the west side of the Seven heads, and extends from that headland to Galley head, a distance of 9 miles, in a W. by N. direction. It is not very extensive, being only  $2\frac{1}{2}$  miles deep, and the shores are generally high and rocky, with foul ground within a quarter of a mile of them, which renders approaching too near dangerous; there are several rocky patches in the bay, but as they all lie within half a mile of the shore, few only are in the way of large vessels. With Ring head bearing N.N.E., about 2 miles, is a spot of 8 fathoms, named the *Shallow rock*.

A small bay, full of rocks and foul ground, called Dunworly bay, lies on the eastern side of Clonakilty bay. It has 4 to 6 fathoms in it; but is of little value as a place of shelter.

The entrance to the harbour of Clonakilty is between Ring head on the east, and the eastern extremity of a sandy beach of  $\frac{1}{2}$  a mile in extent, which runs off from Inchydoney on the west side. The harbour is fit for small vessels only, and, the entrance being exposed, the going either in or out, when the wind is southerly, is very dangerous, as near the entrance the sea breaks from one side to the other, and the channel is thereby rendered undistinguishable. As there are but 2 feet water on the bar at low tides, no vessel ought to run for the harbour in blowing weather, unless under great necessity, and with three-quarters' flood. There is a rock known as the *Wind rock* on the north side of Ring head, which extends to the edge of the channel, and must be avoided. At the small village of South Ring, three-quarters of a mile within Ring head, there is a pier 230 feet long, with a depth of about one fathom, where vessels generally lie. The channel on the south side of Inchydoney, along Muchruss head, is fit for boats only.

In the middle of Clonakilty bay, about a mile southward of Ring point, a vessel may stop when the wind is off shore, in 10 or 12 fathoms.

Close to Galley head, on its eastern side, is Dirk bay, a small inlet about half a mile in depth, where good anchorage may be obtained when the wind is westerly, in from 3 to 4 fathoms water, on a fine sandy bottom. In the eastern part of the bay is *Carrigduff rock*, which covers at half-tide, having westward of it foul ground for nearly a cable's length.

**Galley Head** is about 120 feet in height, and when seen from the east or west appears to be an island, because the narrow isthmus which connects it with the main-

land is itself much lower than the headland. On the isthmus are the ruins of Dundeady castle. Nearly half a mile from Galley head, in a S.  $\frac{1}{2}$  E. direction, is a patch of rocks known as the *Clout*, which has not less than 5 fathoms over it; and half-way between Clout rock and the head is another patch, with  $3\frac{1}{2}$  fathoms upon it, called the Inner Clout; between this and the headland there are 11 fathoms water. There is also another rock in a westerly direction from Galley head, at the distance of half a mile, named the Dhulic rock, which is awash at low water; this rock is steep on its north and east sides, but foul ground extends from it to the south-westward to the distance of  $1\frac{1}{2}$  cables. Almost close to the seaward side of this rock there are from 10 to 16 fathoms, and between it and the shore 11 and 12 fathoms; but be careful when sailing through this passage not to approach the shore too closely, on account of the rocky ledges lying at the foot of the Galley head:—a good mark for the channel is the spire of Rosscarberry cathedral just open of Creggan point, the eastern limit of Rosscarberry harbour: this mark will also lead  $1\frac{3}{4}$  cables westward of *Cloghna*, a pinnacle rock with only 4 feet on it, but deep water close to it, which rock is about half a mile off a head of the same name, situated nearly midway between Galley head and Rosscarberry harbour.

At the distance of about  $2\frac{1}{4}$  miles, in W.S.W.  $\frac{1}{2}$  W. direction from Galley head, is a rock named *Robber*, which is said to carry but 4 fathoms over it, though the surveyors found not less than 8 upon it. Close to the rock there are from 15 to 23 fathoms. Here the spring tides have a rate of about 3 miles per hour.

**Rosscarberry Harbour** lies about 3 miles to the N. by W.  $\frac{3}{4}$  W. of Galley head, and is a little creek capable of affording shelter to small vessels; but unless the weather is very moderate, it is difficult for any vessel to go either in or out. The channel is subject to alterations by southerly winds, especially when they blow hard from the S.S.W. to S.S.E.; the entrance also becomes dry at low water, and is rough and dangerous at high water when the wind is on the shore. There are 10 feet on the bar at high-water spring tides, and 8 feet with neap tides. With off-shore winds and moderate weather vessels may anchor on the west side of Galley head, between it and Rosscarberry harbour, and also several miles westward of Rosscarberry, on clear ground, about half a mile or a mile from the shore.

**Glandore Harbour.**—This harbour lies about  $3\frac{1}{2}$  miles westward of Rosscarberry harbour, and its entrance is easily distinguished by an old telegraph tower on the high cliffy shore of Foilnashark head. The breadth between this head and Sheela point, the western boundary of the entrance, is one mile. Off Sheela point is a small island, 99 feet high, named *Adam*; the depth between it and the point is 6 to 8 fathoms, but there is a rock nearly in mid-channel, having 11 feet water over it, which renders this passage somewhat hazardous. Higher up the harbour is a small island, 23 feet high, named *Eve*. Adam island should not be approached closer than  $2\frac{1}{2}$  cables on its northern side, on account of outlying rocks, but it is otherwise comparatively free from danger.

About a mile within the entrance of the harbour, and nearly in mid-channel, is a series of small rocks known as the *Dangers*, all of which uncover at low water, and are marked by perches, except the northern one, which has 6 feet over it at low water. On each side of these rocks there is a channel sufficiently deep for large ships; but that on the west side is reckoned the best, because of its simple guiding mark, viz., the western end of Adam island in one with Glandore castle, or the eastern end of Eve island in one with the western end of Adam island. Shipmasters unacquainted with the locality had better anchor between Adam and Eve islands.

When standing in from south-eastward for Glandore harbour or Castle haven during the night, keep a look-out for the High islands.



Vessels can ride more easily in Glandore harbour than in Castle haven, though the former appears more exposed than the latter, as the force of the sea is considerably checked by Adam and Eve islands and the Dangers. There is also a finer run for the sea to expend itself up the harbour.

Near the head of Glandore harbour vessels may lie very safely off Coosaneigh point, although there are only 9 feet there at low water: the ground being soft ooze prevents their receiving any damage. At about high-water neap tides, ships of 12 feet water may run up a cable or two above the house of Ballincella, and lie there very safely on soft mud. There is but little stream of tide in Glandore harbour. Supplies in small quantities can be obtained here, and fresh water from the streams running from the hills.

**Castle Haven.**—From Glandore harbour the coast runs in a westerly direction, about 3 miles, to Castle haven, and is high and steep, with several rocky islands off it, the first of which is Rabbit, an island about 58 feet high, with many large rocks near it, some of which are under water. This group of rocky islets lies with the shore to the northward in such a manner as to form the small harbour of *Squince*, in which is a depth of 4 to 5 fathoms, and good shelter for fishing-vessels when the wind is westerly. A little southward of this group is a dangerous rock awash at low-water spring tides, named *Belly*, which is the more dangerous as there are soundings of from 5 to 7 fathoms within 100 yards of it; to clear this rock on the south side keep castle Freke (eastward of Rosscarberry harbour) open of Downeen point (E.  $\frac{1}{4}$  N.), or the Black rock (southward of Horse island, entrance of Castle haven) in one with the northern peak of Beenteane hill.

*High Islands* are a group of rocky islets lying off the shore about midway between Glandore and Castle haven; they are about half a mile from the land, the soundings between being 8 to 12 fathoms, rocky bottom and shells. These islands must not be closely approached on account of outlying dangers, although a short distance off them to the southward is a depth of 9 to 15 fathoms. The easternmost island is said to be 150 feet high.

Close to the entrance of Castle haven on the east side is a small islet, named Skiddy, which is surrounded by a rocky ledge, so that there is no safe passage between it and the shore. Eastward of this, about three-quarters of a mile, and directly within the High islands is an inlet, named Blind harbour; which is too shoal to admit anything but boats.

The harbour of Castle haven affords very good shelter for vessels of 14 feet draught, against all winds, except those from between S.S.W. and S. by E., which send in a very heavy breaking sea, though not so as to endanger the riding of any vessel whose ground-tackling can be depended upon. The entrance lies between an island named Horse, on the western side, and the remarkable high flat rock known as the *Skiddy*, mentioned in the preceding paragraph, on the eastern side, the distance between them being nearly half a mile; it is free from danger without the distance of half a cable from either shore. Having passed the Black rock and Horse island, steer in as nearly mid-channel as possible until you perceive the Stag rocks (off Toe head) appearing between Horse island and the shore westward of it. These rocks, a little open or touching the eastern point of Flea island, are the leading mark up the harbour and to the anchorage. There are not less than 9 fathoms water at the mouth of the harbour, nor less than 5 abreast the ruined tower in Castle haven; it gradually shoals to 10 feet, and to less as you proceed north-eastward upon the before-mentioned leading mark. A small rocky head, called the Colonel rock, lying off the north-west side of Reen point on the east side of the harbour, makes it necessary that the above leading-mark or a mid-channel course should be preserved.

Neither the ebb nor flood here possesses any strength. It is high water on the

days of full and change at 4h. 20m., and the water rises and falls on high spring tides 12 feet.

**Stag Rocks.**—From Horse island to Toe head the coast is high and rocky,—Beenteane hill, nearly midway between these points, being 350 feet above the level of the sea. Off Toe head, at the distance of three-quarters of a mile in a S. by W.  $\frac{1}{4}$  W. direction, lie the Stag rocks, a high, rugged, and precipitous cluster, the largest of which rises to the height of about 66 feet. With the exception of the south-western end, this group of rocks is tolerably steep, there being 12 to 16 fathoms close to them on all sides; they are said to resemble pinnacles when viewed from the eastward or westward. There is a very good and safe passage between these rocks and Toe head, having a depth of 13 to 21 fathoms; when sailing through keep rather nearer to the Stags than the land.

At about a mile eastward of Toe head is Scullane point, on which is an old telegraph tower used as a coast-guard station.

**Barlogue.**—Westward of Toe head are two deep indentations of the land, named Toe head and Tragomna bays, neither of which afford shelter; in the western part of the latter bay is a narrow inlet leading to lough Hyne, which inlet forms a small but secure harbour, named Barlogue. This harbour affords shelter only to fishing boats, being much confined on the eastern side by Bullock island. Lough Hyne is of considerable depth, there being in some parts of it as much as 20 fathoms water; but there is no access to it for shipping on account of the rapids, which will not allow even small boats to pass. Southward of Gokane point, about midway between Toe head and Barlogue harbour, and separating the two before-mentioned bays, is a spot of 4 fathoms, lying about  $\frac{1}{3}$  of a mile from the point, with 16 fathoms between.

**BALTIMORE.**—From Barlogue harbour the coast takes a westerly direction to Spain point, off which, at the distance of a quarter of a mile, is Kedge island, a high, rugged, but flat-topped island; the space between the island and the main is full of pinnacle rocks, although there is a passage of not less than 4 fathoms, used by coasters, between Spain point and the nearest rock. This island and Sherkin island, about three miles westward of it, form the eastern and western boundaries of Baltimore bay.

Sherkin island is a very irregularly-shaped island of  $2\frac{1}{2}$  miles in extent, the northern and south-western shores of which are encumbered with rocks. To the north-eastward of this are Spanish and Ringarogy islands; these, together with Sherkin island and the main land, form the boundaries of Baltimore harbour.

Baltimore harbour is situated about  $5\frac{1}{2}$  miles north-eastward of cape Clear, and is a safe and commodious anchorage for small vessels. The entrance lies between Beacon point on the eastern side, and Barrack point on Sherkin island on the western. In consequence of these points being high, and nearly perpendicular, and the land within being also elevated, and presenting nearly the same aspect to an observer in the offing, the mouth of the harbour is not easily distinguished at any considerable distance. There is, however, a telegraph tower about a mile eastward of the entrance, above Spain point, and a ruined house or fort appears on the summit of the western point, which with a fine stone beacon recently erected on Beacon point, serve to mark the entrance. The Fastnet also kept in sight eastward of the south-eastern end of Cape Clear island, will lead within half a mile of the entrance.

The dangers in Baltimore harbour are:—The *Loo rock*, which lies on the eastern side of the entrance, in a north-westerly direction from the stone beacon before alluded to, and nearly one-fourth of the distance across from the eastern to the western points; it is about 10 fathoms in length and 5 in breadth, trending east and west, and appears awash at  $4\frac{1}{2}$  hours' ebb; it is marked by a red buoy, with 'Loo rock' painted on it,

situated 20 fathoms S.W. of the rock.\* Two *small ledges* of sunken rocks, on the western side, under Sherkin island, one a little south-eastward of Barrack point, and the other a little north-eastward of it, but they do not advance sufficiently from the land to interfere with vessels navigating in the fairway. The *Quarry rock*, 2 cables north-eastward of the Loo, on the starboard hand going in. The *Lousy rocks*, which lie considerably within the mouth of the harbour, in the direction of N.N.E.  $\frac{1}{4}$  N. from the stone beacon, and appear a little before half-ebb. On the largest of the Lousy rocks there is an iron perch, from which the rock is known as the Perch. A little northward of the Lousy rocks are the *Globe rocks*; and at  $2\frac{1}{2}$  cables E.  $\frac{1}{2}$  S. from the Perch rock is *Wallis rock*, which is marked by a buoy. The ground is both foul and shallow for a considerable distance round these rocks westward, north-westward, and northward, in which directions are several heads which occasionally dry. Between these rocks and the land eastward the ground is clear, with the exception of the Wallis rock, but there are not 2 fathoms of water. There are other ledges of rocks in different parts of the harbour, but their contiguity to the land, or distance from the anchoring ground, renders a description of them unnecessary.

The depth at one mile seaward from the harbour's mouth is 20 fathoms, at the entrance 14 fathoms, and within, after passing Loo rock, it shoals abruptly to 5 and 3 fathoms. When entering the harbour a leading wind is required to enable a vessel to fetch the anchorage without tacking; steer boldly in N.N.E.  $\frac{3}{4}$  E. without being discouraged by the threatening aspect of the cliffs, keeping one-third of the whole distance across nearer to the western than the eastern point, until the ruined abbey which stands in a small bight in Sherkin island, bears N.W. by W.  $\frac{1}{2}$  W.; then anchor in as nearly mid-channel as circumstances permit. By keeping one-third nearer to the western than to the eastern land, vessels will pass westward of the Loo, and when Baltimore church appears in sight over the sandy beach on the starboard hand going in, they will be considerably to the northward of, or within that rock. There is always a ground swell in this harbour when the wind prevails between W. by N. and S.E., which increases very considerably in boisterous weather. The winds from the southward of East or West are leading winds in, and those from the northward of East or West, fair out.

There is accommodation in this harbour in what is called the outer anchorage, south-westward of the perch, for one or two small frigates, in at least 20 feet water; and 18 or 20 vessels, whose draught does not exceed 9 feet, may find good shelter south-eastward of the perch in what is called the inner anchorage; but in this anchorage is the rocky patch, with  $6\frac{1}{2}$  feet water on it, called Wallis rock, marked by a buoy. Vessels under the draught of 7 feet may find shelter afloat everywhere and in any numbers, or they may take the ground abreast of O'Driscoll's quay; there they will lie on mud.

In the outer anchorage, moor East and West, and in the inner one N.W. and S.E. The greatest rise and fall of the tide, after moderate weather, is 13 feet, ordinary rise about 11 feet. The flood sets right in through the entrance, and the ebb as directly out. It is high water full and change 4h. 23m. The watering-place is at Baltimore, on the east side of the harbour, where there is a quay and coast-guard station. There is a narrow and very intricate passage out of the harbour, northward of Sherkin island; but it can only be used by the smallest ships, and by one well acquainted with the navigation.

**Gascanane Sound.**—At about a mile westward of the south-western point of Sherkin island is the eastern end of Cape Clear island. The channel between these

\* It has been proposed to erect a beacon on this rock.



islands, named Gascanane sound, has several rocky islets and sunken ledges in it, the latter of which are for the most part dry at low water. The sound is too dangerous to make very free use with during a heavy gale, yet in fine weather it is frequently used, as there is sufficient water for the largest ships.

Capt. Martin White, R.N., says, "In the event of a vessel being driven in between the Stag rocks and cape Clear, in a gale of wind from the southward, which always produces a heavy sea, the knowledge of Baltimore harbour becomes of the very first importance, as no stranger can attempt the passage of Gascanane sound with any prospect of success, under such circumstances, unless during daylight. This dangerous passage lies between Cape Clear island and the Badger, a small island off the S.W. end of Sherkin island, and derives its name from the two rocks situated nearly in the vortex thereof, viz. :—the Great and Little Gascanane, or, as the former is sometimes called, the Carrigmore rocks, the term Gascanane being more particularly applied to the Lesser Gascanane, which is a rock visible only at low water. The Great Gascanane or Carrigmore rock lies nearly midway between Cape Clear island and Sherkin; it is always very high above the water, and appears somewhat scattered and disunited. The Lesser Gascanane lies between the one just described and Cape Clear island, and at 5 hours' flood shows but one head, then awash; its base is, however, very extensive, and it nearly unites with Great Gascanane. There are therefore two channels through this sound, one on each side of the Gascanane rocks. The *eastern* one is the best and safest, the water being deepest, the set of the tide more regular, and vessels have only to keep in mid-channel. For the safe navigation of the *western channel* vessels must borrow within 80 or 90 fathoms of the rocky shore of cape Clear, where, however, they will be subjected to more sets of tide than one. There is no safe passage between the Gascanane rocks for any but very small handy vessels. In order that the position of the Great Gascanane rock may not be mistaken, let it be remembered that the long north-western mark for the centre of the rock is Leamcon tower, which stands upon a hill westward of mount Gabriel, exactly over the eastern end of the westernmost Calf. There are from 12 to 26 fathoms water throughout the eastern passage of Gascanane."

*Tides.*—The tide between Waterford and Youghal flows until 5 o'clock, but the stream in the offing continues to run 3 hours longer. The principal stream of flood sets in from the westward, and at a distance of 5 or 6 miles from the shore; it does not run, when strongest, above one mile in an hour, except it be near to the headlands.

The tides on the coast, and in the harbours between Youghal and Galley head, flow until half-past 4 o'clock; the stream continues to run 3 hours after. Spring tides rise 11 feet, neap tides 6. The flood sets in from the westward, and the ebb from the eastward. Within three miles from the shore the strongest spring tides do not run above one mile in an hour, except near to the headlands, westward of Kinsale, where their velocity, when strongest, is about 3 miles an hour.

The tides on the coast and in the harbours between Galley head and cape Clear flow on the change and full days until about 4 o'clock; but the stream of flood continues to run to the eastward, in the offing, for three hours longer; and the ebb from that time runs to the westward for six hours, or until it is half flood on the shore. The spring tides rise 11 feet, and the neap tides 6 or 7 feet. At the distance of a mile from the shore the strongest spring tides do not run more than a mile in an hour; near to the headlands they run two miles.

## CAPE CLEAR TO THE RIVER SHANNON.

**CAPE CLEAR.**—The land in the vicinity of cape Clear is high, precipitous, and bold. There are two small inlets in Cape Clear island, one on the south-eastern side named Southport, and the other on the north-western side known as Northport, but neither affords permanent shelter or common convenience to vessels larger than hookers, though they may be, and indeed have been made useful to others in cases of great emergency. The south-eastern cove is the most extensive as well as the deepest, but in boisterous weather from any quarter westward of N.W., or eastward of N.E., the reflux of the sea is so powerful in each harbour as occasionally to draw vessels to sea, however well secured they may be. In order to fall in with the cape, when coming from the offing, keep Hungry hill (situated behind Bear haven, and 2181 feet high) N. by W., or mount Gabriel (behind Skull harbour, and 1328 feet high) N. by E.

The western shore of Cape Clear island is not so bold as the eastern, and should not be approached nearer than half a mile, particularly the north-western shore, off which are some rocky islets, named Bird islands, having a reef extending from them to nearly one-third of a mile to the north-westward, called the *Bullig*, part of which is awash at low water. This reef is steep, as there are 5 and 6 fathoms close to its extremity; but a vessel may clear it in 14 to 16 fathoms by bringing Sherkin chapel (white) in one with the Telegraph tower on the hills over Spain point eastward of Baltimore harbour.

At  $1\frac{3}{4}$  miles northward of Cape Clear island are three small islands, named West, Middle, and East Calf. As the shores of these islands are encumbered with rocks, they must not be closely approached; yet there is a passage of 6 to 10 fathoms between the Middle and East Calf, which is occasionally used by small vessels. To the northward of Calf islands is a group of rocky islets connected together by ledges dry at low water, named the Carthy islets; and northward of these again, is Castle island, from the western extremity of which a rocky bank extends half a mile, and partly dries at low water.\*

Eastward of the Calf islands are numerous islands and rocks, situated before the entrance of Roaringwater bay; between these there are passages affording in general sufficient water for moderate-sized vessels; yet it would not be prudent for such to attempt to run so far up Long Island bay without a pilot, on account of the intricacy of the navigation.

**Fastnet.**—This rock lies about W. by S.  $\frac{1}{4}$  S.,  $3\frac{1}{2}$  miles from cape Clear, and rises 93 feet above the level of the sea; between it and Cape Clear island are soundings of from 12 to 35 fathoms, and close to the sides of the rock are 10 to 12 and 24 fathoms. A small shoal lies off the N.E. point of this rock, bearing from it N.E. by E., distant nearly a quarter of a mile; on it there are only 3 to 11 feet water, but close to its eastern boundary are  $5\frac{1}{2}$  fathoms, and at a distance of a cable are 10, 12, and 14 fathoms; on its south-west side are  $9\frac{1}{2}$  fathoms. No ship ought to go so near the Fastnet as this shoal lies; but if compelled to do so, there is a good channel between them. A shoal also extends from the Fastnet, in a S.W. direction, about a cable's length. From the Fastnet rock, Mizen head lies N.W.  $\frac{1}{2}$  N., 9 miles; and the entrance of Crookhaven N.  $\frac{1}{2}$  W., 6 miles.

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\* The south-west edge of this reef (Amelia reef) was marked in 1861 by a red buoy. It was moored in 10 fathoms, with Rincolisky castle, just opening south of Castle island E. by S.  $\frac{1}{4}$  S.; the old lighthouse on Cape Clear island over the west point of Middle Calf island S.  $\frac{1}{2}$  W.; and Copper point, Long island, N.N.W.  $\frac{3}{4}$  W.

*Light.*—The lighthouse, on the summit of Fastnet rock, shows a light *revolving* once in every *two minutes*, at a height of 148 feet above the sea level, so that it can be seen in clear weather from all directions (360°), at the distance of 18 miles. The building is circular, with a broad horizontal red belt round the middle.

The dangers principally to be feared near the Irish coast, north-westward of cape Clear, are as follow:—The Bullig rock off Three Castle head, the Crow rock, the south-western tail of the Great Skellig, the Foze, and the different sunken rocks among the Blaskets.

The other rocks in this quarter, as well indeed as the shore itself, are steep and bold. The space between cape Clear, Long island, Crookhaven, and the Fastnet is almost free from danger, though in boisterous weather the sea breaks here and there violently, caused by the rough elevations of the ground.

When approaching the land, neither Long island nor Goat island can, in the first instance, be clearly discerned, owing to their proximity to the main land, with which, indeed, they appear to be identified. The Fastnet rock, however, if kept S.S.W.  $\frac{1}{2}$  W., or Leamcon high tower, if kept N.N.E.  $\frac{1}{2}$  E., will lead directly to Goat island, and as you proceed will open the passage eastward and westward thereof. Mount Gabriel in one with Leamcon tower and castle, bearing E.N.E.  $\frac{1}{2}$  E., will open the western avenues; and the south-western end of cape Clear kept just open of the south-western end of the western Calf island will lead to the south-eastern passage between Long island and Castle island. When entering this passage be careful to avoid the dangers lying to the south-west of Castle island; the mark to clear them is Cosheen crag and Barnacleeve gap in one bearing N.N.E.  $\frac{1}{2}$  E.

**LONG ISLAND SOUND** is well sheltered, of easy access, and capable of receiving large ships, which may enter at either end of the island, and anchor anywhere on good ground; but it is necessary to be careful of a spit of sand named the Cush spit,\* which runs off about half a mile within the east end of the island, and extends northward nearly half over the channel.

The three principal passages into Long Island sound are, one from the south-westward, between Goat island and Turf island; one between Goat island and Long island; and the eastern passage between Long island and Castle island, which may be taken without a pilot.

*S.E. Passage.*—Coming from the westward, and intending to enter the sound by this passage, run along the southern side of Long island, giving the shore a berth of rather more than a quarter of a mile; sailing thus a dangerous rocky ledge will be avoided, which projects in a westerly direction from Castle island, extending thence more than one-third of the channel across, and having only 12 feet over it at low water. The southern mark for this shoal is the south-west end of the western Calf in one with the south-west extremity of Cape Clear island. Having rounded Copper point, the eastern end of Long island (marked by a beacon 45 feet high), if in a large vessel, anchor as soon as the said point bears South, taking care also not to shut in the tower on Brow head with the southern side of Gun point and Coney island, in order to avoid the spit of sand before described, which projects from Long island, and which, partially drying, divides the eastern from the western anchorage;—also, take care to avoid Bull rock in the mouth of Skull harbour, marked by a perch.

*S.W. Passages.*—When entering by the passage between Goat island and Long island, keep in mid-channel, and continue so to the anchorage.

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\* Now (1861) marked by a black buoy moored in 5 fathoms, with Leamcon telegraph tower over the first low point at the west side of the entrance to Colla cove bearing N.W.; the perch in Skull harbour in one with the south-east end of Connor island E. by N.  $\frac{1}{2}$  N.; and Skull point N.E. by E.  $\frac{1}{4}$  E.



When entering the passage between Goat island and Long island, it is necessary to keep one-third nearer the former than the latter, until the rocky ledge which runs out in a north-westerly direction from Long island has been passed. By keeping over towards the main till within about  $1\frac{1}{2}$  cables from the shore, a vessel will get to the northward of this rocky ledge, and be in the fairway, when she must proceed in mid-channel until the anchorage is reached. The ground is everywhere a soft cohesive mud, and the depth varies from 2 to 7 fathoms. It is high water on the days of full and change of the moon at 4h., and the greatest vertical rise and fall of tide, after a series of moderate weather, is 12 feet.

**Skull Harbour** lies at the eastern end of Long Island sound. It is pretty well sheltered, the ground good, and the water in the anchorage from 2 to  $3\frac{1}{2}$  fathoms. There is only one rock to be avoided, which is marked by a perch; it lies in the middle of the entrance, and is dry at two hours' ebb; the mark for it is the western end of the western Calf in one with the eastern end of Long island; and when the southern bluff of Brow head begins to shut in with Gun point, you are very near its southern edge.

Skull harbour is not so good an anchorage as Long Island sound, being more exposed to the swell raised by south-westerly winds; neither is the ground so good. The best time to enter is at or after half-flood, as the rock in the entrance is then above water. See the directions for the S.E. passage to Long Island sound, just given.

**Toormore Bay.**—At nearly a mile N.W.  $\frac{3}{4}$  W. from Turf island there is a group of rocks named Dhuharrig, having a narrow channel of deep water between them and the coast called by the fishermen Barrel sound. These rocks form the southern side of the extensive bay of Toormore, in which the soundings gradually decrease from 10 to 7 fathoms, the latter being close to the shore.

A dangerous rock hereabout is the *Bulligmore*, upon which are only 3 feet at low-water springs. It is distant half a mile from Turf island in a W.  $\frac{2}{3}$  N. direction, and about the same distance S.S.E. from the Dhuharrig rocks, and close to it is a depth of 6 and 9 fathoms. There is also a 12-foot rock at  $\frac{1}{2}$  of a mile W.  $\frac{1}{4}$  S. from this, and half a mile S. by W.  $\frac{1}{8}$  W. from the Dhuharrig rocks, having close to it a depth of 8 and 12 fathoms. In boisterous weather the sea breaks tremendously upon all these rocks, and at such times the situation of the various rocky heads in their vicinity can likewise be seen.

When bound into Long Island sound from the westward, vessels may pass southward of the Bulligmore and other dangers, by keeping the south-west point of Long island well open of Little Goat island,\* bearing E.  $\frac{1}{2}$  S.;—Mizen peak in one with Alderman head, or Castle island in sight southward of Goat island, are also marks that will carry a vessel southward of all these dangers.

**CROOKHAVEN.**—The entrance to Crookhaven lies  $6\frac{3}{4}$  miles N.  $\frac{3}{4}$  W. from the Fastnet rock. The harbour is narrower, but it is well sheltered, and commodious: the ground is good and the water sufficiently deep for large ships. Captain Martin White, R.N., says:—"When running in from the offing for Crookhaven, the opening to which cannot be made out till very near Alderman head, steer in from the Fastnet North, keeping the latter rock due South, as near as may be, until Mizen peak comes in one with Alderman head. When doing this you cannot be deceived, because at the same time, or nearly so, mount Gabriel will appear in one with Leamcon signal tower and castle to the north-eastward, and the Brow head (on which there is also a signal tower) will appear to close in with Alderman head to the westward. The harbour will now begin

\* On the south end of Little Goat island there is a beacon.

to unfold itself; the Revenue Officers' houses on the northern shore will first be seen, and ultimately Coghlan's white look-out tower on the southern side. Vessels drawing upwards of 12 feet cannot, during a great spring tide, bring Coghlan's tower more southerly than S.S.W. without touching at low water; in fine weather, however, no inconvenience will arise from suing.

When the harbour is open, run right in, keeping directly in mid-channel. The signal tower on Brow head, three times its own apparent breadth, open to the northward of a remarkable white house, on the eastern part of the peninsula (standing entirely by itself) West, leads northward of Alderman rock, and is also the mark for the fairway of the entrance.

Alderman rock lies off the head which bears that name, and is consequently on the southern side of the entrance. Two distinct heads of this rock are always above water, and are of some considerable extent.

The bottom of Crookhaven is dark blue mud, remarkably soft as well as deep, and there is no danger whatever therein, except one solitary rock which lies off Granny islands, which shows at low-water spring-tides. The long eastern mark for this rock is Leamcon tower just open southward of the bluff point of Rock island. Vessels, therefore, of any burthen, in the event of loss of anchors, or otherwise in distress, may boldly run quite up the haven until they take the ground, provided they keep in the middle of the channel. Pilots are always ready, and will come off in any weather when signalled.

Vessels cannot, however, enter Crookhaven unless the wind is southward and eastward of S.S.W., or eastward and northward of N. by W.; but when the wind happens to be foul for Crookhaven, it will prove fair for Long Island sound. Vessels may anchor with westerly and northerly winds, one mile north-eastward of Alderman rock, in very good ground; but great circumspection must be used in providing against southerly winds."

A white circular lighthouse, 45 feet high, stands on Rock Island point, the northern side of the entrance to Crookhaven, from which is exhibited a *fixed white* light, at the height of 67 feet above the level of high water. It bears from the S.W. point of Cape Clear island, N.W.  $\frac{1}{2}$  N., 8 miles: Alderman rock (outer point,) N.W. half a mile, and Fastnet rock, N.  $\frac{3}{4}$  W.,  $6\frac{1}{2}$  miles. Towards Long Island bay, and the inner part of Crookhaven, the light is *white*, but in the direction of Alderman rock and Streak head, or when bearing from a vessel between N.W.  $\frac{1}{2}$  W. and N.  $\frac{1}{4}$  E. ( $53\frac{1}{2}^{\circ}$ ) *red*. Vessels therefore about to enter Crookhaven, should, in order to clear this rock, keep north-eastward of the northern limit of the *red* light. The *white* light is visible in clear weather from a distance of 13 miles, and the *red* light from about 10 miles.

**Mizen Head, &c.**—The space between the Streak head and Mizen head is generally steep, there being from 15 to 20 fathoms within a quarter of a mile of the shore; there are, however, some sunken rocks westward of Brow head, as well as south-east of Mizen head, which may be avoided by keeping Leamcon tower in one with, or open of Streak head until Three Castle head appears westward of Mizen head, as this mark will carry very considerably without them.

*Barley cove*, a small inlet between Mizen head and Brow head, is separated from Crookhaven by a narrow isthmus of sand. On several occasions this bight has been mistaken by foreigners for a good harbour, which it appears to be when viewed from the offing. There is, however, no safety in it, even temporary, with any wind, particularly from the westward, though it may help to preserve lives on an emergency. There is a rock directly in the centre of it which shows occasionally, as well as some others in its vicinity, but the western shore, close under the Mizen land, is pretty clear.

At about half a mile from Three Castle head, in the direction of W.  $\frac{1}{2}$  S., there is a sunken rock named *Bullig*, with only twelve feet water over it at low-water spring tides: here the sea, in boisterous weather, breaks very heavily. By keeping Hungry hill ever so little open westward of the pitch of Sheep head a vessel will pass considerably westward of it; and by opening out Bird island, a huge rock on the south side of Dunmanus bay, three times its own apparent breadth northward of Three Castle head, a vessel will pass close to its north side. The south side of Bird island, touching Three Castle head, is the mark for the centre of the rock. There are several rocky heads between this breaker and the land, with different depths of water over them; it is not safe therefore to pass between. Three Castle head is two miles northward of Mizen head, and is rendered remarkable by the old castellated building which stands on its summit.

**Hurd Bank.**—The centre of this bank lies in lat.  $51^{\circ} 13' N.$ , and long.  $10^{\circ} 37' W.$  It extends in an E.N.E. and W.S.W. direction, and is 7 miles across in its broadest part, which is at its eastern end. Mount Gabriel, just appearing westward of Mizen head peak, and the Bull rock in one with the eastern side of the westernmost Hog island, are the marks for the middle of the bank; on all parts of it are from 83 to 86 fathoms water, and from 90 to 100 all around. It is greatly resorted to by the Irish fishermen in the summer season, and produces great quantities of fish, especially cod, ling, and conger eels.

About 4 miles S. by E.  $\frac{1}{2}$  E. from Mizen head, there is a patch of foul ground, known as the Mizen rock, with 28 fathoms on it. Between this and the shore the depth is 34 to 37 fathoms.

**DUNMANUS BAY.**—The entrance to this bay lies between Three Castle head to the southward, and Sheep head to the northward, whence there is deep water and good holding ground nearly up as far as Rosmore castle, distant 4 leagues from its mouth. The bay trends nearly E.  $\frac{1}{2}$  N. and W.  $\frac{1}{2}$  S., and is in consequence much exposed to the fury of westerly gales, the effects of which are very severe westward of Carberry and Furze islands. It is not generally frequented by large vessels; there is, notwithstanding, very good anchorage for the largest ships anywhere above Carberry island, in from 9 to 14 fathoms water, on good holding-ground, but the nearer to the southern shore, near Cushalawn hill, the better. Carberry and Furze islands are about 7 miles within the entrance, and the proper channel to the anchorage lies northward of them both, that is, between Carberry island and the northern shore.

At about a quarter of a mile W.N.W. from the north-west point of Carberry island, is a narrow rocky shoal of from 6 to 18 feet water, extending in a north and south direction, and generally easily recognised by the swell of the sea, which, in strong westerly winds, breaks violently. The gap in Cushalawn hill open northward of Carberry island, E. by S.  $\frac{2}{3}$  S., leads northward of it. There are channels among these islands, but they are so much encumbered with rocks and shoals as to be serviceable to none but small vessels navigated by those having local knowledge. When beating up eastward of Carberry islands, give the southern shore, between those islands and Drishane point, 2 miles further up, a good berth on account of the sunken rocks and ledges, which in some places extend off fully 2 cables. The northern shore throughout this bay is tolerably bold up to Reen point.

At  $3\frac{1}{4}$  miles E. by N.  $\frac{1}{2}$  N. from the highest part of Carberry island is Reen point. Above this point both shores of the bay are less bold, and there are several outlying patches. Rather more than half-way over from Reen point, towards an old fort on the southern shore, lies the Doona rock, with from 12 to 18 feet over it, and E.  $\frac{1}{4}$  S., half a mile from the same point, is a 6-foot rock; besides these there are in this neighbourhood other shallow spots of from 16 to 22 feet, but all will be avoided, and a depth of 11, 8,



7, 6, and  $4\frac{1}{2}$  fathoms maintained up to the anchorage in *Dunbeacon harbour*, by keeping, when off Reen point, Three Castle head, Bird island, and the north point of Carberry island all in one, bearing about W. by S., westerly, until a house, situated among some trees at the head of the bay, named Ardogeena house, appears midway between Mannion island and Dunbeacon point, E. by S.  $\frac{1}{2}$  S. If while on the former bearing it is necessary to tack towards the northern shore, be careful to keep the tower on Sheep head open of Reen point, to avoid the 6-foot rock just mentioned. Ardogeena house E. by S.  $\frac{1}{2}$  S. will lead to the anchorage in Dunbeacon harbour, just within Mannion island, in 4 or  $4\frac{1}{2}$  fathoms.

**BANTRY BAY** lies northward of Dunmanus bay, its entrance being between Sheep head and Bear island. The general direction of the bay is nearly that of Dunmanus, its extent is about 6 leagues, and its breadth from 3 to 5 miles. It is of easy access, there being no rocks or shoals whatever in the way but such as common precaution will serve to avoid, and scarcely any tide. The depth of water throughout varies from 10 to 32 fathoms, and the ground is perfectly clear, as well as of the most tenacious description; but the bay is very much exposed to the effects of a westerly wind; still, when this is the case, Bear haven and the harbours of Bantry and Glengariff may be resorted to with the greatest convenience, without a pilot.

*Light*.—On the northern side of the bay, on Roancarrig island, at the eastern entrance of Bear haven, is a lighthouse showing a *fixed* light at 55 feet above the sea, visible about 12 miles; the arc illuminated is from E. by S. southward to N.W. by W.  $\frac{1}{2}$  W. ( $197^{\circ}$ ). The tower is white, and has a red belt under the projecting gallery; a building of an oblong form is attached to it.

This lighthouse is in latitude  $51^{\circ} 39' 10''$  N., longitude  $9^{\circ} 44' 49''$  W., and bears from the north point of Whiddy island, just open of Mehal point, W.  $\frac{7}{8}$  N. distant  $10\frac{1}{4}$  miles; Ducalia (half-tide rock), W. by N.  $\frac{1}{2}$  N., distant half a mile; Gerane West rock (off the south-west point of Whiddy island), W. by N.  $\frac{5}{8}$  N.,  $7\frac{1}{2}$  miles; Sheep head N.E. by E.  $\frac{1}{4}$  E.,  $7\frac{3}{4}$  miles; Lonehort point, Bear island, E. by S.  $\frac{1}{4}$  S.,  $1\frac{1}{2}$  miles; and Sea point, E.S.E.  $\frac{1}{2}$  S., 4 miles.

**Bantry Harbour**.—When approaching the bay the lofty mountain named Hungry hill will be very conspicuous, and be easily recognised; its summit is 2181 feet above the sea. At the head of the bay are two anchoring places; one on the south, and the other on the north shore. That on the south shore lies within Whiddy island, and northward of Bantry town; the westernmost entrance to it is on the south side of Whiddy, and is not more than 2 cables wide, where narrowest; this channel has a bar, over which the least water is 7 feet at low tide, and there is also a rock lying right in the fairway, the leading mark to avoid which, and to go between it and the main, and likewise to preserve the greatest depth over the bar, is Reenbeg cliff in one with the high-water mark at South beach, on the southern shore, East; this course must be taken up immediately the west redoubt on Whiddy bears North, and must not be used too freely. When approaching the flagstaff on the starboard hand, on Blue hill, steer over into mid-channel, and up the anchorage.

The widest and deepest passage into Bantry harbour is northward and eastward of Whiddy island. When making use of this channel, whether bound for Bantry or Glengariff, always keep Roancarrig lighthouse in sight, and having rounded Reenavanny point, the north-east point of Whiddy, anchor at about 3 cables northward of Horse island in 8 or 9 fathoms, in what is called *Whiddy harbour*. Here Horse island divides the entrance to Bantry harbour into two channels, of which the *eastern* one is the widest, deepest, and has the simplest leading mark, viz., the gap in the hill in one with the farmhouse just behind Bantry house, S.S.W.  $\frac{3}{4}$  W.; when past Chapel island, the next within Horse island, anchor where convenient in from 4 to 5 fathoms. The

*western* channel, between Horse island and Whiddy, may be taken by bringing a white house (the vicarage) situated among trees in one with the farmhouse in the hollow of Chapel island, about S.S.W.  $\frac{3}{4}$  W.; this mark will lead up to abreast of Hog island, on the starboard hand,—if intending to go south of Chapel island, bring a pile on a distant hill on which the highest part of North beach, situated off the south point of Whiddy, and when round the west end of Chapel island, which must have a berth of nearly 2 cables, the anchorage may be selected as before. A vessel may also anchor between Horse and Chapel islands in  $5\frac{1}{2}$  or 6 fathoms, landlocked and secure from all winds.

In Bantry harbour, be cautious not to anchor nearer the town of Bantry than when the flagstaff in front of Bantry house bears S. by W. This precaution will be found absolutely necessary, as the inner section of Bantry harbour has become extremely dangerous, owing to neglect, and small vessels throwing their ballast overboard.

**Glengariff Harbour** is on the north side of Bantry bay, opposite Whiddy island, and is quite small, with a narrow entrance. When sailing from Whiddy or Bantry harbours for this harbour do not, when clear of the N.E. point of Whiddy, approach the coast north of Whiddy island nearer than half a mile, in order to avoid the Castle breaker, Carrigskye and Morneen rocks, which lie nearly that distance off the shore, and are steep.

Within Glengariff harbour there is an island named Garinish with a castellated fort having a martello tower on it, eastward of which lies the passage in; this passage, abreast the island, is not more than  $1\frac{1}{2}$  cables wide, and has from 6 to 12 fathoms in it at that part. To run into the harbour bring the martello tower on Garinish island to bear N. by E., and steer for it, keeping in mid-channel until Gun point is a-beam, bearing E. by S., then steer N.E.  $\frac{3}{4}$  E. until Gun point is in one with Reenanick point, the western point of Whiddy island; with these two points in one, run N.N.E.  $\frac{3}{4}$  E., eastward of Garinish island and the islets off it, keeping about a cable from the eastern shore, in order to avoid some sunken rocks which lie off from the island; after the island is passed anchor in from 3 to 5 fathoms. This place is very small, and the ground indifferent, it is therefore seldom or never used by any but coasters or fishermen. In the summer time the largest ships may ride without the island, in the mouth of the harbour, in from 7 to 10 fathoms, on good holding ground, in what is called the outer anchorage. In the N.W. part of this anchorage, at  $2\frac{1}{2}$  cables from the shore, there is a small rocky patch, with only 12 feet water, called the Portuguese rock, which must be carefully avoided.

From Glengariff harbour to Bear haven, the coast runs westerly 10 miles, and affords no shelter worthy of mention. At about half a mile E.S.E.  $\frac{1}{2}$  E. from Roancarrig island is a dangerous group of rocks, named *Ducalia*, the largest of which shows itself at low water. It almost universally betrays itself, by the ebullition in its vicinity, particularly in boisterous weather, when it breaks even at high water, and with great violence. Close to these rocks are soundings of 5 and 6 fathoms. To avoid them on the south side, keep Roancarrig lighthouse in one with Coarrid point on the northern shore of Bear haven. In a N.E. direction from Ducalia rocks and S.E. distant  $2\frac{1}{2}$  cables from Bulliga point, is a rocky patch with only 12 feet water on it.

At about one-fourth of a mile N.  $\frac{1}{2}$  E. from Roancarrig island, are the Roancarrig rocks, from which towards the island a rocky ledge projects out nearly half-way across the channel; vessels therefore obliged to pass between the island and the rocks, should keep near enough to the former to avoid it.

**Bear Haven** is formed by Bear island on the south and the mainland on the north. Bear island is high and rugged, the highest part being at the west end, whence it slopes gradually to the east. On the western summit, the highest, is a telegraph-

tower, and eastward of this are four martello towers. The southern shore of the island is steep and cliffy, particularly the vicinity of the south-western point, and close to it is deep water; off the middle of this shore stands the Feagh rock, and 2 cables southward of this is the Greenan rock, both of which are only 3 feet above high water. To the east of these rocks is Clonaghlin head, with a martello tower upon it; foul ground extends to about 2 cables from this, and terminates in a rocky shoal, with as little as 25 feet upon it at low water.

Bear haven affords excellent shelter for vessels of any size, and for any number, against all winds that blow. The depths of water throughout the haven vary from 4 to 12 fathoms, and the ground is principally clay and mud. There are two channels to the anchorage, one at the western end of Bear island, and the other at the eastern end, between the Currigavaddra rocks and Roancarrig island.

*Eastern channel.*—The principal dangers to the free navigation of the eastern channel into Bear haven are the Currigavaddra rocks, the eastern extremity of which lies more than half a mile from Lonehort point, the eastern point of Bear island, in a south-easterly direction; they thence extend in a westerly direction fully one-third of a mile. Several heads of these rocks appear above water at an hour's ebb; and though at high water they are covered, they always betray themselves by the agitation even in fine weather. A *white* buoy is moored at the eastern extremity of these dangers, in 5 fathoms, and a perch with a ball on it has been placed on Dog rock, the outer one; vessels may pass close to the east side of the buoy. There is no passage between these rocks and Bear island for any but very small vessels, the depth being only 8 to 10 feet. The breadth of the ship channel between the Currigavaddra rocks and Roancarrig island is three-quarters of a mile, and has from 7 to 17 fathoms water in it. Vessels may, therefore, turn through it without difficulty, having always in view the set of the tide. When rounding the breakers which these rocks occasion, give them a berth of about one-fourth of a mile, or borrow within that distance of Roancarrig island, which, as there are no leading marks, is perhaps the safest direction that can be given to a stranger. When westward of Lonehort point a large vessel may anchor in 9 or 11 fathoms, anywhere up to Mill cove on the northern shore.

*Western channel.*—The western entrance to Bear haven is very narrow, and as the land on each side is high and precipitous, and subject to flaws, it should not be attempted unless with a leading wind. The winds at all to the south of S.E., or west of W. by N., are free winds in; and those which blow from between E.N.E. and N.W. by N. are leading winds out. When attempting this entrance to Bear haven some precaution is necessary, as the harbour of Pulleen  $1\frac{1}{2}$  miles westward of it, when viewed from the south-westward, presents nearly the same appearance, and may possibly be mistaken for it by a stranger. In order to guard against this, bear in mind that the pitch of Mizen head nearly shut in with that of Three Castle head, is a direct mark for the western entrance to Bear haven; but from Pulleen harbour, Mizen head appears considerably open westward of Three Castle head. There is also a signal tower on the westernmost elevation of Bear island, not far from the entrance, which serves more fully to indicate its situation.

In the western channel the shores are bold, and when near the entrance the Piper rocks close to the western shore may be seen; they are high, yet not easily distinguished. That part of the channel off Piper point, named the Narrows, is only 2 cables wide; half a mile inside this, nearly in mid-channel, is the Harbour rock, with only 11 feet water on it, and of a pinnacle shape; it is marked by a *red* buoy placed in 16 feet, close to its S.E. side. About  $3\frac{1}{2}$  cables northward of the Harbour rock are the Colt rocks, off Drum point in the middle of Dunboy bay, which appear about 3 feet above the surface of the last quarter flood. In order to avoid all these rocks



steer as nearly in mid-channel as possible (for there are no two objects capable of being made an uninterrupted leading mark), borrowing somewhat nearer to Bear island as you close with the Harbour rock, and again recovering the mid-channel course as soon as possible after passing them. The thwart mark for the Colt rocks is Dunboy house appearing W.N.W.  $\frac{1}{4}$  W. Continue on in mid-channel, and anchor in from 9 to 11 fathoms off the S.E. side of Dinish island. The *white* buoys off the Walter Scott and Volage rocks and the *black* buoy on the Hornet rock sufficiently point out their situation; no stranger should attempt to go between these buoys and the northern shore, even with a small vessel.

About  $1\frac{1}{2}$  miles westward of the western entrance of Bear haven is *Pulleen harbour*, a small inlet of the sea, formed by perpendicular cliffs, in which are 2 to 7 fathoms, bottom of sand. It is seldom visited by vessels larger than hookers, and even for these there is scarcely adequate shelter.

*Tides*.—The tides on this part of the coast flow on the full and change days at 3h. 45m.; and the stream of flood continues to run along Mizen head for two hours later. The flood tide sets from the N.W. along the coast, and the ebb from the S.E. In the offing, about a league from the shore, the strongest spring tides do not run above  $1\frac{1}{2}$  miles in an hour. Within a mile of Mizen head, the tide of ebb or westward stream runs  $3\frac{1}{2}$  miles in an hour, and it commonly makes a rough sea there.

**Dursey Island** trends westward from the mainland, its western point lying about  $2\frac{3}{4}$  miles W.N.W.  $\frac{1}{4}$  N. from Crow head, and Crow head is at the distance of  $9\frac{1}{2}$  miles from the S.W. point of Bear island. With easterly wind and moderate weather ships may anchor anywhere between Crow head and Dursey island. At 3 cables south-westward from Crow head lies the Crow rock, which covers only at high springs.

The *Bull*, *Cow*, *Calf*, and *Heifer* rocks, lie from 1 to 3 miles southward and westward from Dursey island, and are all steep excepting the western side of the Bull. There are soundings of from 36 to 44 fathoms between each of these rocks, yet notwithstanding this great depth, the rapidity of the tide causes so violent an ebullition as to induce the appearance of the channels not being navigable; there is, however, no danger whatever save the occasional inequality of the tide. The Bull, the most western of the rocks, has somewhat the appearance of a cone. Among them the floods run at the rate of 3 and  $3\frac{1}{2}$  knots per hour, and the ebb stronger;—between Dursey island and the main, the flood through the narrow channels runs at the rate of 4 knots, but the ebb is not so strong.

*Light*.—Upon the Calf rock there is a lighthouse, consisting of a circular tower painted red, with a broad white central belt, which shows a light *flashing every 15 seconds*, at 136 feet above the sea, visible from a distance of about 17 miles. The tower is 102 feet high.

**Ballydonegan and Quoylach**.—Between Dursey island and the mouth of Kenmare river are Ballydonegan and Quoylach bays, both of which are open to the westward. The shores of the former are rugged and steep, with from 8 and 16 to 24 and 30 fathoms at 3 cables off, and no danger beyond that distance, the bay being deep throughout; anchorage and shelter from westerly and southerly winds are said to be afforded by Garinish bay, in the south-west part. In Quoylach bay there are several rocks and rocky patches, all of which break in bad weather; also several rocky islets. If bound to the anchorage in the small harbour of *Ballycrovane* in the north-east corner, and having rounded Cod's head, bring Bull rock in line with that head, about W.  $\frac{1}{3}$  S. and keep it so until within half a mile of Inishfarnard island, when an E. by S.  $\frac{3}{4}$  S. course, midway between Reen point and Ainrush islet on the starboard hand, will lead up to it clear of all danger; the entrance is but a cable wide between the rocks which run out from the shores, but there are 8, 6, 5, and 4 fathoms to the

anchorage. This little harbour is a place of great security for vessels of a moderate size when once within it. There is at the south side of the narrow entrance a small rock outstanding from the shore, called Gurteen, which just covers at high water. It is high water here on the days of full and change at 3h. 42m. Springs rise  $10\frac{1}{2}$  and neaps  $7\frac{3}{4}$  feet; mean range of neaps 4ft. 10in.

At the distance of 2 cables W. by N. from the west end of the Inishfarnard isles lies the *Bulligabridane rock*, which uncovers 3 feet at low water, and  $5\frac{1}{2}$  cables West from the same point is the *Stickeen rock*, which shows 6 feet at low springs; between these rocks there are from 6 to 16 fathoms water. To pass westward and north-westward of them, to or from Kenmare river, keep the tower on Dursey island well open of Cod's head, bearing W.S.W., southerly.

**KENMARE RIVER.**—From a position  $1\frac{1}{2}$  miles north of the Stickeen rock the fairway course up the Kenmare river would be East for 10 miles, with no danger in the way, except what lies within half a mile of the shore; afterwards E.  $\frac{3}{4}$  N. 5 miles southward of the Maiden and Lackeen rocks and abreast the Halissy rock; and then E. by S.  $\frac{1}{2}$  S.  $\frac{3}{4}$  of a mile to an anchorage in 6 fathoms, or the same course for  $2\frac{1}{4}$  miles, bringing up in 4 or 3 fathoms good holding ground, near the mouth of Dunkerron harbour. The town of Kenmare is  $3\frac{1}{2}$  miles further up, but above Dunkerron harbour the water is very shallow, decreasing from  $2\frac{1}{2}$  to  $1\frac{1}{2}$  and  $\frac{1}{2}$  a fathom in the narrow channel between the Mussel bank and the quay. From the mouth of the river the depths in mid-channel decrease gradually from 33 to 17 fathoms near the Maiden, above which there are 15, 10, and 7 fathoms close to the Halissy rock; between the Halissy and Maiden the flood runs  $\frac{1}{2}$  and the ebb  $\frac{3}{4}$  of a knot per hour.

The *Maiden rock* lies in the fairway of the river, at rather more than half a mile S.E. from the extremity of Bullig point, the westernmost point of Rossmore island; it rises from an extensive base in deep water to a very small pinnacle, the summit of which is awash at low spring tides. The *Lackeen* is 3 miles above the Maiden, and lies between the mouth of the Blackwater river and the large modern castle of Dromore; it therefore occupies the central portion of the estuary. It is a very extensive ridge of limestone with various depths; and north and south of it, along each shore, are deep and wide passages, with 7, 8, and 12 fathoms water. On the west end of the Lackeen ridge are high heads, with as little as 9 and 10 feet at low water. These heads lie in the middle of the apparent fairway, and just eastward of the valley of the Blackwater. About half a mile eastward of the Lackeen rocks, and nearly  $2\frac{1}{2}$  cables northward of Reenafeagh point, on the south shore, is a very small head of rock with 13 feet water, rising from deep water; it is named *Halissy rock*, and lies right in the fairway, opposite a 12-foot patch lying on the eastern end of Lackeen bank. Immediately eastward of this latter rock (Halissy), is a great expanse of fair anchorage, suitable for the largest ships.

Besides the foregoing there are the rocks at the mouth of Ardgroom harbour; the Carrignawohil,  $\frac{3}{4}$  of a mile above Kilmakilloge harbour, which extends  $\frac{1}{4}$  mile from the shore, and shows only at low water; two outlying rocks, with 7 and 8 feet over them, about 2 miles above Kilmakilloge, 5 cables S. by W. from the Maiden, and nearly half a mile from the nearest point of the southern shore, at the termination of much foul ground, extending westward from Leaghillaun point, northward of Ardrea castle ruins; and a patch of 16 feet  $1\frac{1}{4}$  miles E.  $\frac{1}{2}$  S. from the Maiden, and  $3\frac{1}{2}$  cables off the south shore; hence by giving the starboard shore going up a berth of  $\frac{2}{3}$  mile all these may be passed in safety until up with the Lackeen bank.

About  $1\frac{1}{2}$  miles above the Lackeen bank the fairway of the navigation is greatly narrowed by the Carrignarone rocks on the north side, and Horse or Brennel island, and rocks on the south side. The outer or little Carrignarone rock is marked with a

very small indistinct perch; as is likewise the outermost rock N.E. of Horse island. A cable north of this latter rock is a 4-foot rock, named the Bat.

Immediately eastward of the narrows of Horse island is the wide expanse or roadstead called *Dinish island anchorage*; the uppermost anchorage for large vessels. It is capacious and safe, with good holding ground, and with  $3\frac{1}{2}$  and 4 fathoms depth over muddy bottom. At the north side of this capacious anchorage is a small sunken rock, the Bowlings, of only 4 feet; it is, however, well out of the fairway.

The principal harbours in Kenmare river are Ardgroom and Kilmakilloge on the south side, and Sneem harbour on the northern.

**Ardgroom Harbour.**—About  $3\frac{1}{2}$  cables N.W. by N. from Knocknamona point, the western point of the entrance of Ardgroom harbour, is a shoal of 16-feet water which breaks in heavy gales. When passing through the channel between it and the shore a depth of 13 and 14 fathoms will be found, but be careful to guard against the *Kidney rock*, extending  $1\frac{1}{2}$  cables from the shore, the heads of which only are visible at high water. The Carrigavaniheen rock is 3 feet above high water, and is surrounded with a rocky shoal, which on the eastern side runs from the rock a distance of nearly 2 cables to the eastward. A patch of 9 feet lies  $\frac{1}{3}$  of a mile E. by N. from the Carrigavaniheen, over which the sea breaks in bad weather. The best passage into the harbour is between the Carrigavaniheen rock and Knocknamona point.

The bar is  $\frac{1}{3}$  of a mile within Knocknamona point, and has not less than 9 feet over it at low tide, but there are so many rocky patches in the way that a stranger could not, even if it were thoroughly buoyed, enter with safety without a good pilot. The anchorage is well sheltered, the ground good, and available by all vessels not drawing more than 12 or 13 feet water. A ship drawing 10 feet should wait until half flood before entering. The anchorage is in the western part of the harbour, in from 4 to 6 fathoms.

**Kilmakilloge Harbour**,  $1\frac{1}{2}$  miles eastward of the western entrance of Ardgroom harbour, is well sheltered, has good holding ground, and is capable of receiving large ships. In entering borrow nearer to the western shore than the eastern, because of the *Book rocks*, which run nearly half-way over from the foot of a grassy cliff on the port hand, and are awash at low water. When within this reef anchor in 8 fathoms water, with Spanish islet, a small clay island 14 feet in height, lying near the middle of the harbour, bearing S.S.E.  $\frac{2}{3}$  E.  $\frac{1}{4}$  of a mile distant; the islet should not be approached nearer nor brought to bear eastward of this, because of a stony spit with from 2 to 16 feet water which surrounds it on all sides, extending to a distance of from  $1\frac{1}{2}$  cables off its northern side to 3 cables off its north-western. But the best anchorage, where most security is afforded, is in  $4\frac{1}{2}$  fathoms within Spanish island bank, in a creek in the western part of the harbour, named Collorous harbour, to go to which it will be necessary to keep at  $\frac{1}{3}$  the distance from the starboard shore over towards Spanish islet, as the bank occupies nearly two-thirds the width of the channel. Another place to anchor in is eastward of the islet in 5 or  $5\frac{1}{2}$  fathoms, rounding it at a distance of about 2 cables.

If a vessel is to stop here any considerable time, especially in the winter, or if she be not provided with good anchors and cables, she may, by keeping at an equal distance from both shores after passing Spanish island, go into a creek in the eastern part of the harbour, where there is easy riding in 2 fathoms.

**Sneem.**—This harbour is on the northern side of Kenmare river, and opposite the two preceding harbours. It has two entrances, one northward of Sherky islands, and one eastward of them, between them and Rossdohan island; the latter is the wider and deeper, there being no danger beyond a quarter of a mile from either shore, except a 12-foot patch lying nearly 3 cables westward from the starboard point going in. The



former passage is a cable wide where narrowest, and has a depth of from 16 to 7 fathoms, but the leading mark into the roadstead, viz., Derryquin castle, in a line with Derrygariff peak, E. by N. northerly, leads over the northern part of a bank running from Sherky islands in 13 feet only.

Sneem roadstead cannot be much recommended on account of the great extent of rocky bottom which prevails, the bad configuration of the islands which defend it on the west, and the unsafe nature of the shores around. What may properly be called Sneem harbour is only that part of the bay which is sheltered on the south side by the east point of Garinish island. It is not capacious nor well shaped, but it contains an extensive natural dock, formed by the eastern prongs of the island of Garinish, in which a vessel of considerable size would be quite secure by taking the ground on very deep mud of the softest description, and where she would be waterborne from 8 to 11 feet at low spring tides. The entrance of the harbour is quite invisible at night. As the middle of the harbour is more exposed, and the bottom in several parts foul, it is not fit for riding in long.

There are other harbours and places of anchorage in Kenmare river, but as a stranger, driven in by stress of weather, will find the required accommodation in one or other of the foregoing places, it is unnecessary to add any further description.

At the mouth of Kenmare river it is high water on the days of full and change of the moon at about 3h. 30m., and in Dunkerron harbour, at the head of the estuary, at 3h. 45m.; in Dunkerron harbour springs rise  $10\frac{1}{2}$  feet, and neaps 7ft. 11in., the mean range of neaps 5ft. 4in.

The *Hog islands* form the northern side of the entrance to Kenmare river; they are steep with 28 and 30 fathoms close to them. There are several spots among them which break in gales, but none have less than  $4\frac{1}{2}$  fathoms.

**Ballinskelligs Bay.**—N. by E.  $\frac{1}{2}$  E., distant  $11\frac{3}{4}$  miles from the Bull rock, is Bolus head, and  $4\frac{1}{2}$  miles S.E. by E.  $\frac{1}{2}$  E. from Bolus head is Hogs' head; these form the entrance to Ballinskelligs bay, which is quite open to south-west winds, and little frequented. During summer a ship may stop on the north side of it, at a little more than a cable N.E. by N. from Horse island, in 5 to  $2\frac{1}{2}$  fathoms; the mark for anchoring is the east point of the island on with, or very little open of, Hogs' head, but in turning into this anchorage, look out for the Bay rock, which has only 5 feet over it, and lies N.E. by E.  $\frac{3}{4}$  mile from the eastern end of Horse island, and about the same distance from shore. The Blue Boy rocks extend 6 or 7 cables from the eastern shore;—with these exceptions the water, from a depth of 13 and 14 fathoms in the middle, shoals pretty gradually towards the head of the bay.

**SKELLIGS.**—At about 14 miles N. by W. from the Bull rock is the great or westernmost Skellig rock. Upon this rock is a lighthouse, 46 feet high, which shows a *fixed* light. It is 175 feet above the sea, and can be seen from the distance of 18 miles in clear weather. It shows over an arc of  $236^{\circ}$  (from N. by W. seaward to E.S.E.).

At the distance of  $1\frac{1}{4}$  miles eastward of the Great Skellig is the Little Skellig, 2 miles eastward of which is the Lemon rock. The Lemon rock is 70 feet high; it bears N.W.  $\frac{1}{2}$  W. distant  $4\frac{1}{2}$  miles from Bolus head.

A rocky ledge projects from the Great Skellig about half a mile south-westward, and one also juts out from the Lemon rock to the south-eastward; but there is no danger whatever to be feared among these rocky islets, nor between them and the land, except that which arises from the tide, which divides a little to the westward, one branch taking a northerly, and the other a southerly direction. A line drawn from Bray head, on Valentia island, to the Great Skellig, and thence to Bolus head, will mark out the eddy caused by the streams of ebb and flood, or the line of division just referred to.

At the distance of 6 miles E. by N. from the Great Skellig is Puffin island, situated nearly midway between Bolus head and Bray head, all three lying almost North and South, one from the other. Bray head is N.E. by E.  $\frac{1}{3}$  E. from the Great Skellig, distant  $7\frac{1}{2}$  miles; it is the eastern end of Valentia island, and has on it a signal-tower in ruins. This island extends for nearly 6 miles eastward, and forms the western boundary of the harbour of the same name.

**VALENTIA HARBOUR.**—This harbour is formed by the island of Valentia on the western and southern sides, by Beginnis island to the northward, and by the mainland on the eastern side: it affords excellent shelter against all winds, with good holding ground in 36 to 42 feet at low-water spring tides.

The *North-West* or principal entrance to the harbour is between Cromwell fort on the island of Valentia and Beginnis; this passage is very much narrowed by a ledge of flat rocks projecting from Beginnis, and extending to a distance of 150 yards in a north-westerly direction, on the extremity of which is a rock, called Cloghavalig, with only 3 feet water on it; and also by the rocks off Cromwell fort, so that the navigable passage is reduced in width to 180 yards. This entrance can be satisfactorily made out, on account of the bold abruptness of Doulus head, and the remarkable basaltic cone, called Coarhacoin hill or the Pilot's look-out, on Beginnis. On a nearer approach it is better indicated by a circular white lighthouse, which stands within the old building of Cromwell fort on the western side of the entrance, and bears from Reenada point, S.E. by E. distant  $1\frac{1}{8}$  mile; Doulus head, S.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{8}$  mile; and Cloghavalig (sunken rock), W. by S.  $\frac{1}{4}$  S.,  $1\frac{3}{4}$  cables. The light is a *fixed* light shown over an arc of  $197^{\circ}$  (from N.W. northward and eastward to S.S.E.  $\frac{1}{2}$  E.), and elevated 54 feet above the level of high-water springs, or 60 feet above the mean level of the sea, and can be seen at the distance of 12 miles; it is an excellent object for clearing Reenada point, and also the Harbour rock within the entrance. The shelving rocks previously mentioned partly cover at high-water, and extend three-quarters of a cable north-eastward from Cromwell fort.

If bound into Valentia, steer for Doulus head, giving Reenada point, the northern side of the island of Valentia, a berth of about a mile or more, until Cromwell fort bears S. by E., when it will be in one with the square tower of the church standing on a cliff of Valentia island, considerably above the water's edge, and having close to it the parsonage house. This mark leads to the entrance of the harbour: bring now the half-ruined Glebe house twice its breadth eastward of the perch on Harbour rock and it will lead in mid-channel of the entrance. No apprehension need be excited by the formidable appearance which the shores of Beginnis present, nor by the contiguity of the rocky point on which Cromwell fort stands. Having passed the Narrows, steer along the side of Beginnis, in order to avoid the Harbour rock, the perch on which lies S. by E.  $\frac{1}{3}$  E. from the lighthouse and a little southward of the fairway in; it will be avoided so long as Doulus head is shut in behind the west end of Beginnis, or keep Bennettee mountain over Cruppaun point on Beginnis till within two cables of this point. Nearly midway between the Harbour rock and Cruppaun point, or  $1\frac{1}{2}$  cables eastward of the perch on the former, is a rocky patch with only 14 feet over it at low water. Cruppaun point also runs off shoal in a westerly direction about  $1\frac{1}{2}$  cables. When rounding this point vessels will open the little white church of Cahersiveen, which stands some distance up the river to the eastward, and being whitewashed is very conspicuous, and they will be approaching the anchorage, the best position for which is pointed out by the following intersections: the ruined castle of Ballycarbery on the northern side of Caher river, in one with the south-east side of Church

island, bearing E.  $\frac{3}{4}$  N., and Cromwell fort touching the south-eastern point of Beginnis island.

During strong breezes from westward, the space between Cromwell fort and the island of Beginnis is one sheet of breakers, which renders it necessary that fresh way should be preserved on the ship, lest she be warped so far out of her proper direction as to receive the impulse of the sea on her quarter, which would certainly prove disastrous. Notwithstanding the apparent difficulties, however, which seem to present themselves in making out and entering the harbour of Valentia, the attempt, under the most unfavourable circumstances, is far preferable to the risk of passing a winter's night in Dingle bay. The most approved method of mooring in Valentia is north-west and south-east, with about half a cable on each anchor.

The flood tides run fairly in according to the trend of the land, and the ebb as regularly out; but the strength of neither is material, unless in the Narrows, and there it does not exceed  $1\frac{1}{2}$  or 2 knots.

At the eastern extremity of the island of Valentia, on what is called Foot point, is Knight's town. Between this point and Reenard point, on the opposite side, the distance is 3 cables; the passage is from 4 to 7 fathoms deep, but the navigation of nearly half of it is impeded by a gravelly spit running from Foot point. The light-house, over the south side of Beginnis, clears this spit on the north side. Beyond this, at the back of Valentia island, there is a large space of clear and well-sheltered anchoring ground, with a depth varying from  $1\frac{1}{2}$  to 7 fathoms on muddy bottom.

The *West Entrance* of Valentia harbour, south of Bray head, is clear of shoals so far up as port Magee; opposite this place, on the Valentia side, there is a little bay, in which a vessel may find pretty good shelter in 2 fathoms on clean sand. To go farther up for better shelter requires high water and a pilot. The tide flows here at 3h. 30m. Springs rise about 11 and neaps about 8 feet.

**Doulus bay.**—On the north side of Beginnis island, between it and Doulus head, is Doulus bay, which to appearance affords another entrance to Valentia harbour, and when viewed from the westward, is frequently mistaken for the real entrance; but the water is too shallow and rocky at its head to permit any vessel to venture in.

**DINGLE BAY.**—Dingle bay trends East and West; its length is about 20 miles, and its breadth from 10 to 5 miles. In moderate weather a ship may anchor in almost any part of it, at above a mile from the shore, on clean ground, the shores on both sides being steep. About half a mile eastward of Keownglas point, on the south side of the bay, there is a small rock which dries at low water. Between this rock and Kells bay, the depths are from 18 to 11 fathoms very near the shore; and between Kells bay and the bar of Castlemaine harbour, 9, 5, 7, and 6 fathoms.

**Castlemaine harbour** is very safe but of difficult access; there is a spit of sand on each side of the outer channel, which runs out from the points forming the harbour's mouth, and extends nearly 2 miles to seaward. Near the extremities of these spits of sand, a bar runs across the channel, on which there are only 9 feet water. The sea generally breaks on the spits, and the breakers may be easily seen a mile or two off. Ships that draw 12 feet water may go over the bar at half-flood; but as there is neither buoy nor perch to mark the channel and no land-marks can be recognised by strangers, the assistance of a pilot is absolutely requisite.

From Castlemaine harbour the northern shore of Dingle bay takes first a northerly direction for 3 miles, and then trends W. by N. 10 miles to Dingle harbour.

**Dingle harbour** will accommodate only small vessels, which lie aground on soft mud at low water. A leading wind and flood tide are necessary; and in order to avoid a ledge of rocks which extends from Black point, half-way over to the



opposite shore, vessels should keep only about one-third from the west side of the entrance.\*

About half a mile westward of the entrance of Dingle harbour, and nearly half a mile from the shore, there is a rock called the Crow, which is steep on all sides, and never covered except with high spring tides. There are also other rocks near it which must be carefully avoided.

**Ventry harbour** lies about 3 miles westward of Dingle harbour, the entrance to it being between the points of Paddock and Parkmore, distant from each other about three-quarters of a mile, whence the bay trends to the north-westward  $1\frac{1}{2}$  miles. The ground in all parts of the harbour is loose and sandy, and consequently bad for holding, and the transition from deep to shoal water is very sudden, viz., from 12 fathoms to 6, and thence to 3, the last depth being abreast of the village on the northern side. It is exposed directly to winds from south-eastward, which, in their passage across Dingle bay, send in a heavy short sea. The effects of the wind and sea from westward, although broken by the land, produce nevertheless an uneasy swell, which the circular form of the harbour helps to maintain.

When coming from westward or south-westward, the mouth of the bay cannot in the first instance be clearly made out, owing to the mainland, with which the peninsula forming the southern side of Ventry harbour appears, at any considerable distance, to be in some degree identified. There is, however, an old house or building, formerly used as a look-out station, standing near the edge of the precipice, about a mile westward of the bay, which, together with the two black rocks attached to the western point thereof, will serve, on a nearer approach, to mark the entrance; or, in the event of these not being sufficiently conspicuous, bring Cromwell fort, Valencia, open westward of the perpendicular pitch of Doulus head.

**BLASKETS, &c.**—Nearly N.N.W. 4 miles from the entrance to Ventry harbour lies Slea point, which is surmounted by mount Eagle, 1684 feet high. From Slea point, the west end of the Great Blasket bears W. by N.  $4\frac{3}{4}$  miles.

The Blaskets are a group of islets and rocks, occupying a space of  $7\frac{1}{2}$  miles in a W.S.W. direction from Dunmore head and the coast northward of it. The large isle, the Great Blasket, is 3 miles in length and nearly half a mile in breadth; it is 961 feet high. The east end of the island is one mile westward from Dunmore head, and the west end W.  $\frac{1}{2}$  S. 4 miles from the same. Two islets, Nabro and Vickillane, lie within 2 miles to the S.W. by W. from the west end of the island; and a remarkable high rock called the Great Foze, the outermost of the group, lies at 5 miles W.  $\frac{3}{4}$  S. from the same point.

Tooskert, the northern islet of the group, lies at 3 miles N.N.E. from the western point of the Great Blasket, in lat.  $52^{\circ} 8' N.$ , and long.  $10^{\circ} 35' W.$ , and a high rock, named Tearaght, lies 3 miles N.W. by W.  $\frac{1}{2}$  W. from the same point.

*Light.*—Upon Tearaght rock is a lighthouse, from which is exhibited a *revolving white light*, attaining its greatest brilliancy every  $1\frac{1}{2}$  minutes. It is 275 feet above the sea level and visible 22 miles. The arc illuminated is from S.  $\frac{3}{4}$  E. westward to E. by N.  $\frac{3}{4}$  N. ( $258\frac{3}{4}^{\circ}$ ). The tower is 57 feet high, of a whitish grey colour; position, lat.  $52^{\circ} 4' 30'' N.$ , long.  $10^{\circ} 40' W.$

The east end of the Great Blasket lies about a mile westward from Dunmore head. A cluster of rocks extends from this end of the island more than a mile to the N.N.E.: some of which are dry at low water, others at half-ebb, and the northernmost are

\* The entrance to Dingle harbour is now marked by beacons. Vessels frequenting Dingle should have the Admiralty chart (No. 2844) at hand for reference; drawings of the beacons are attached to the chart.

always uncovered. By clearing the latter, therefore, the whole will be cleared. At the east end of the Great Basket, a sunken rock has lately been discovered, with only 2 and  $2\frac{1}{2}$  fathoms over it, though at either end there are about 30 fathoms.

Near Dunmore head is a high and remarkable rock named Lure, having at a cable from it, in a westerly direction, a rock covered at high water springs. A very dangerous rock of 15 feet, the Stromboli, also lies nearly in the middle of Basket sound, at 3 cables W. by N. from the west end of Lure, and half a mile S.E. by E.  $\frac{3}{4}$  E. from Gurraun point, the east end of Great Basket island; it has 7 to 8 fathoms close to it, and between it and Gurraun point 11 and 12 fathoms. To clear the Stromboli and all other rocks in Basket sound, keep Clogher rock and the signal tower on Sybil point in one, N.E., and it will lead through in the deepest water.

A rock, long known to fishermen in the neighbourhood as the *Barrack*, lying to the southward of the Blaskets, has recently been examined and its position determined. It has a surface of about 200 feet, rising from a base less than  $\frac{1}{2}$  a cable in extent, with  $4\frac{1}{2}$  fathoms on it at low water springs; it lies S.E.  $\frac{2}{3}$  S.  $2\frac{6}{10}$  miles from Thunder rock (south of Vickillane island), and S.W. by W.  $\frac{1}{2}$  W.  $5\frac{3}{4}$  miles from Sleah head. There is a break on the rock with a heavy swell. About midway between this rock and Dunmore head is a rocky bank with only 3 fathoms water on it, known as the *Wild bank* or *Three-fathom Pinnacle*. Both these rocks have deep water alongside them.

During summer and fine weather vessels may anchor off the east end of Great Basket island, at about a cable from shore, but only if those in charge are well acquainted.

**Smerwick bay** lies on the opposite side of the peninsula, and northward of Ventry harbour; it cannot be deemed a safe place for anchoring in, because northerly winds send a great sea into it; the bottom also, though for the most part clean sand, has so many rocks scattered about that it is difficult to anchor clear of them. The safest and clearest part of the bay is on the west side, at above a cable from the shore, below Smerwick, in 6 or 7 fathoms stiff blue mud. On the east side of the bay are some rocks always above water, but not dangerous.

**Brandon bay.**—Brandon head is about  $7\frac{1}{2}$  miles eastward from Ballydavid head, on the east side of the entrance of Smerwick bay, and 11 miles E.N.E.  $\frac{1}{2}$  E. from Brandon head, is Kerry head, having between them Brandon, Tralee, and Ballyheige bays. In summer vessels may anchor on the west side of Brandon bay on clear ground, but it is not prudent, even then, to remain long in it, for northerly and N.W. winds send a very great sea into it, and the neighbouring mountains produce violent squalls, when the wind blows strongly from the southward or westward. Northward of Magharee point, which separates Brandon bay from that of Tralee, lie the islets named Magharee or Seven Hogs, with numerous rocks, which, as they will be seen, require no further description.

**Tralee bay.**—Here vessels may anchor westward of Fenit island, in nearly the middle of the bay, in  $3\frac{1}{2}$  or 4 fathoms; but they ought not, even in summer, to lie long in the open bay. When entering this bay pass betwixt Mucklaghbeg on the west side and Mucklaghmore on the east side, minding to keep one-third of the distance from the latter, and two-thirds from the former. Mucklaghbeg lies about a mile N.E. by E. from the east point of Magharee: it is a small rock, and always above water. About half a mile E.N.E. from this rock there is a rocky shoal of not more than 12 feet water, upon which the sea breaks in violent weather. Ships, in steering from Brandon head for Kerry head, go northward of all the rocks off Magharee.

Mucklaghmore lies nearly in the middle of the bay, and is 96 feet high. A rock dry at low water springs lies N. by E.  $\frac{1}{2}$  E. a quarter of a mile from it; and another,



having 12 feet upon it, lies three-quarters of a mile from it in a S. by W. direction. At three-quarters of a mile S.E. by E.  $\frac{1}{2}$  E. from Mucklaghmore are the Banagh rocks, 29 feet high; and at nearly the same distance E.  $\frac{1}{4}$  S. from the latter, there is a rock named the Boat, which is covered only at high water springs. At a short distance eastward from the Boat are some rocky patches of  $7\frac{1}{2}$  to 18 feet.

About  $4\frac{1}{2}$  miles southward of Mucklaghmore are the *Samphire islands*, upon the lesser of which is a circular tower, built of blue stones, with several buildings around it. From this tower a *fixed* light is exhibited at a height of 56 feet above the level of high spring tides, and is visible in clear weather at the distance of 9 miles. It shows *red* to seaward between the bearings of N.  $\frac{1}{4}$  E. westward to W. by N.  $\frac{1}{2}$  N. ( $73^\circ$ ); *white* thence to E. by S.  $\frac{3}{4}$  S. ( $183^\circ$ ) over the inner part of the bay;—it is consequently screened towards the land. It is in lat.  $52^\circ 16' 14''$  N., and long.  $9^\circ 52' 53''$  W., and bears from Mucklaghmore rock S.  $\frac{1}{2}$  W.,  $4\frac{1}{2}$  miles; from the rocky shoal eastward of Mucklaghbeg S. by E.  $\frac{1}{4}$  E.  $5\frac{3}{4}$  miles; and from Mucklaghbeg S.S.E.  $5\frac{1}{2}$  miles. By keeping the light visible it will lead in clear of Mucklaghmore, and when within the harbour, by keeping it in sight, a vessel will be within the northern limits of the anchorage eastward of the Samphires in what is called Samphire roads.

A vessel cannot ride with more than half a cable in the harbour of Tralee, unless with east and west winds, for although the ground is good, it is very circumscribed in extent. It is necessary to have the benefit of the flood tide when sailing in, keeping at the distance of half a cable from the south side of the islands. The best place for anchoring is on the east side of the largest Samphire island, in 3 or 4 fathoms, at about a cable from the shore. A ship canal has been constructed to the town of Tralee, so that vessels of considerable tonnage may be brought to lie there with ease and security.

**RIVER SHANNON.**—The river Shannon is of easy access, and can accommodate fleets of the largest ships. Its situation may be known at a great distance by the Brandon mountains, which may be seen 15 leagues off, and by steering for which from southward, the Blasket islands will be made; and its entrance being broad, free from dangers, and lying latitudinally, may be boldly run for. The lighthouse on Loop head, the north side of the river, will also help to distinguish it: it stands in lat.  $52^\circ 33' 38''$  N., and long.  $9^\circ 55' 54''$  W., and shows an *intermittent* light at 277 feet above high water, visible 22 miles; it is bright 20 seconds and eclipsed 4 seconds. The arc illuminated is from N.E. by E.  $\frac{1}{2}$  E. by westward and southward to S.E. by E. ( $298^\circ$ ). Loop head bears from Kerry head, the south side of the river, N.E. by N.  $\frac{1}{2}$  N.  $8\frac{1}{4}$  miles, and the soundings between are 14 to 30 and 24 fathoms hard bottom, composed of sand and gravel. Having made the Loop Head lighthouse, which, from its great elevation, may be seen at least 20 miles, vessels caught in a westerly gale may fearlessly run for shelter to Carrigaholt road, or if bound up the river, to Scatterry or Tarbert roads. The Shannon, however, from the straightness of its course, is very deficient in well-sheltered anchorages for small vessels. It should be navigated by strangers only while in charge of a pilot.



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